This publication was made possible by the U.S. Environmental Protection Agency and the following Earth Programs in Action (EPiA) Education Committee members:

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INDEX

A - CLASSROOM QUICKIES

• **COLOR DAYS:**

WEAR GREEN CLOTHES TO SIGNIFY LIVING PLANTS. BROWN FOR THE SOIL. BLUE FOR THE AIR AND WATER. TALK ABOUT THE IMPORTANCE OF THESE ELEMENTS OF THE EARTH.

• **TRASH IN A FLASH:**

KEEP A BOX LOCATED IN THE CLASSROOM TO COLLECT PAPER - KEEP TRACK OF HOW QUICKLY THE BOX FILLS UP - SEND TO RECYCLING CENTER.

• **PICK OF THE LITTER:**

KEEP YOUR EYES OPEN FOR LITTER OF ANY KIND AND PICK IT UP. RECORD AND SHARE WITH THE CLASS WHAT KIND OF "GARBAGE" IS FOUND.

• **CLASSROOM CALENDAR**

CREATE A LARGE MONTHLY CALENDAR ON THE WALL, WITH DATES ON SEPARATE CARDS AND AMPLE SPACE BELOW EACH DATE. IN SPACES BELOW EACH DATE, STUDENTS CAN ADD SMALL CARDS CONTAINING OBSERVATIONS FROM NATURE, (1ST FLOWER BLOOMED, PHASE OF MOON, ETC.), WEATHER, IMPORTANT DATES (SEASONS START, EARTH DAY, CLASS BIRTHDAYS) ETC. PURPOSE: TO ENCOURAGE OBSERVATION OF NATURAL ENVIRONMENT AROUND US, TO ENCOURAGE AWARENESS. CARDS CAN BE ATTACHED WITH PINS, POSTER PUTTY, VELCRO, OR TAPE AS APPROPRIATE.

• **CALENDAR COMPOST:**

EACH DAY PUT A WAY YOU HAVE HELPED OR ARE HELPING THE ENVIRONMENT (I.E., PICKING UP LITTER, COMPOSTING, TURNING OFF LIGHTS, ETC.)

• **ENVIRONMENTAL MINUTES:**

EACH DAY A CHILD WRITES AN ENVIRONMENTAL MESSAGE ON THE BOARD. (MESSAGES INCLUDED.) THESE CAN BE DISCUSSED AT THE APPROPRIATE TIME. ALL ARE THOUGHT-PROVOKING FACTS.

ENVIRONMENTAL MINUTES

TREES

- A great class project: For $10.00, the National Arbor Day Foundation will send ten free shade trees!
- Over a billion trees are used to make disposable diapers every year.
- Tree nurseries raise upwards of 20 million seedlings a year - plant a tree and encourage your neighbors to do the same.
- Recycling a three and a half foot tall stack of newspapers saves one 20 ft. loblolly pine tree.

AIR

- Forests and oceans are natural sinks for carbon dioxide, but are unable to absorb the quantities currently being emitted.
- On the average, a single car adds its own weight in carbon to the atmosphere each year.
- Chlorofluorocarbons (CFCs), used in refrigerators and air conditioners, account for 17% of the greenhouse effect.
- Trees do more than provide shade and a home for animals; they absorb carbon dioxide - one of the gases that might contribute to global warming.
- The primary cause of acid rain is the combustion of coal and oil, processes in which large quantities of sulfur dioxide and nitrogen oxides are released into the atmosphere.
- In the stratosphere, the atmospheric layer between six and thirty miles above the Earth's surface, ozone forms a layer that shields the Earth against ultraviolet radiation from the sun.
- In the lower atmosphere where ozone is a by-product of fossil fuel, burning it is a harmful air pollutant.
- In 1985, a hole the size of the continental U.S. was discovered in the ozone layer over Antarctica.
- A typical healthy tree removes between 25 and 45 pounds of carbon from the air every year.
- Since carbon dioxide is a gas responsible for 1/2 of the greenhouse effect, trees act as a natural control against global warming.
- L.A. residents drive 142 million miles - the distance from Earth to Mars - every single day.

ENVIRONMENTAL MINUTES
CONTINUED

ALUMINUM / METALS

- If the Pilgrims had used aluminum cans at the first Thanksgiving meal, the cans would still be around today.
- Where does aluminum bauxite come from? Most is imported from Guinea, Australia, and Brazil.
- A recycled aluminum can is typically re-melted and back in the store within six weeks.
- We throw away enough iron and steel to supply all of America's automakers continuously.
- In the U.S., about 70% of all metal is used just once...and is then discarded.
- Every three months, the U.S. throws away enough aluminum to rebuild our commercial air fleet.
- Recycling one aluminum can saves enough energy to run a TV for three hours.
- Don't forget: Aluminum foil is recyclable.

GARBAGE / POLLUTION

- Laid end to end, the 18 billion disposable diapers thrown away in the U.S. each year could reach back and forth to the moon seven times. Use cloth diapers.
- Each year a leading fast food restaurant chain generates enough nonbiodegradable foam packaging to cover Washington, DC with a foot-deep layer. Ask for paper packaging.
- The largest single source of waste paper collected for recycling is corrugated boxes.
- Don't forget: Your old car battery is worth money when you trade it in on a new one.
- Every year, Americans generate about 1,200 lbs. of solid waste per person.
- Packaging Mania: About 8% of America's steel is used for packaging.
- Packaging Mania: About 75% of America's glass is used for packaging.
- The average American family produces about 100 lbs. of trash every week.
- Americans buy and throw away 500 million disposable cigarette lighters every year.
- Three million cars are abandoned in the U.S. every year.
- An estimated 14 billion lbs. of trash are dumped into the sea every year.

GARBAGE/POLLUTION, continued on next page.

ENVIRONMENTAL MINUTES
CONTINUED

- Annually, America produces the equivalent of ten lbs. of plastic for every person on earth.
- At the rate we're generating garbage, we need 500 new dumps every year.
- Packaging Mania: About 50% of paper in the U.S. is used solely for packaging.
- Don't forget: You can wash out plastic bags and reuse them.
- One third of the paper mills in the U.S. use waste paper exclusively.
- How much garbage will you generate in your lifetime? About 600 times your adult weight.
- Dispose of smoke detectors carefully: Some have radioactive parts.
- Leaves alone can account for 75% of solid waste stream in the autumn.
- If you're an average American: One third of your garbage is packaging you toss out immediately.
- Every year Americans throw out 24 million tons of leaves, grass clippings and other yard waste.
- Only about 10% of our hazardous waste is disposed of properly.
- Packaging Mania: About 40% of America's aluminum is used for packaging.
- If a family saved its trash for a year, it would weigh as much as a car.
- Americans toss out enough garbage each year to fill a bumper- to-bumper convoy of garbage trucks halfway to the moon.
- Every 20 minutes, Americans dump enough cars into junk yards to form a stack as high as the Empire State Building.

ENERGY

- The energy saved by recycling one glass bottle could operate a TV for three hours.
- If you convinced two people to do something for the environment, and the next day they convinced two people, and so on, it would take less than a month to get everyone in the U.S. to take action.
- Thermal windows, solar wall heater panels, hot water collectors, solar photo voltaic collectors, sunspaces and thermal curtains are a few of the many ways solar energy can be trapped and used.
- You can cut your heating bill by 2% for every degree you turn down your thermostat.
- An open fireplace damper can let 8% of your heat escape through the chimney.

ENERGY, continued on next page.

ENVIRONMENTAL MINUTES
CONTINUED

- A long-life incandescent bulb is less energy efficient than a standard bulb.
- Energy-saving tip: Keep light bulbs clean; dirt absorbs light and uses more energy.
- Recyclers: Robins, chickadees, and orioles like to use small lengths of string in their nests.
- Doesn't matter if a refrigerator door is open for 15 seconds or 30 — cold air has already escaped.
- Contrary to popular belief: Small appliances don't add much to your electric bill.
- If you have mice in your house—a mousetrap is still the best way to catch them.
- The average U.S. home uses the energy equivalent of 1,253 gallons of oil every year.
- Appliances, heating, and cooling cost the average U.S. home over $1,000 a year in energy.
- The production of meats, dairy products, and eggs accounts for one third of the raw materials used for all purposes in the United States.
- Earth-saving tip: When you buy new appliances, go for the most energy-efficient models.
- About 40% of all battery sales are made during the Christmas season.
- An energy-efficient fluorescent light bulb uses one quarter the energy of a standard incandescent bulb.
- Every year the solar energy contained in the food and fibers we grow in the U.S. is greater than all the energy in the oil we burn.
- Well-positioned trees can shade buildings and reduce their energy consumption by up to 50%.

SOIL / CHEMICALS

- Every year in the U.S. we lose seven billion tons of topsoil- an area the size of Connecticut.
- More than a 200 million tons of pesticides are used annually in California alone.
- Americans spend $6 billion on their lawns every year.

WATER

- Installing a water-saving showerhead can save 10-50 gallons of water for every ten minutes shower you take.
- The U.S. uses 450 billion gallons of water every day.

WATER, continued on next page.

ENVIRONMENTAL MINUTES
CONTINUED

- The smallest drip from a leaky faucet can waste over 50 gallons a day.
- The world's shipping industry dumps over 450,000 plastic containers into the sea every day.
- It takes 1,630,000 gallons of water to feed an American for a year.
- Dishwashing detergent is generally just detergent with dye and artificial fragrance.
- In six months, a leaky toilet wastes 45,000 gallons of water.
- How can you find a leak in your toilet? Put some dye in the tank—if the color shows up in the bowl without a flush, you've got a leak.
- All milk sold in the U.S. today contains pesticide residue.
- Astonishing water fact: To produce one steak, 2,607 gallons of water is needed.
- It takes 100 times more water to produce a pound of meat than a pound of wheat.
- Using a broom, not a hose to clean driveways and steps saves hundreds of gallons of water.
- About 75% of the water we use in our homes is used in the bathroom.
- That's hot: The average annual energy bill for America's hot tubs is $200 million.
- 99.5% of all the fresh water on Earth is in icecaps and glaciers.
- A trigger nozzle on your hose will save at least 20 gallons when you wash your car.
- Astonishing water fact: To produce one pat of butter, 100 gallons of water is required.
- To keep your drain clean: Put a handful of baking soda and 1/2 cup of vinegar down the drain and cover tightly for one minute. Rinse with hot water.
- Only 3% of the Earth's water is fresh water.
- It takes 1/2 a gallon of water to cook a pot of macaroni...and a gallon to wash the pot.
- Just one part oil per million parts water will make drinking water smell and taste funny.
- Astonishing water fact: To produce one serving of chicken, 408 gallons of water are required.
- For each ton of paper recycled, 3,700 pounds of lumber and 24,000 gallons of water are saved.

ENVIRONMENTAL MINUTES
CONTINUED

POLLUTION

- In 1987, America produced over 50 billion pounds of plastic.
- Coffee Alert: According to Debra Lynn Dadd, pesticides banned in the U.S. are shipped to coffee growing countries and used on coffee that's sent back here. Drink organic.
- Artificial color is added to the feed of commercial, egg- laying hens to color their yolks.
- Don't leave puddles of antifreeze on your garage floor - pets like the sweet taste of the toxic.

ANIMALS

- Up to a dozen pelts may be used to make one snow leopard coat.
- Current estimates of the blue whale population are between 200 to 1,100. Before commercial whaling, estimated numbers were around 250,000.
- The hamburgers that McDonald's serves in a week equal more than 16,000 head of cattle.
- The U.S. has been a major consumer of ivory jewelry; unfortunately, most of this ivory comes from poached elephants.
- There are now five billion people on the earth, and there will probably be six billion by the year 2000.
- A millionplant & animal species in the tropical rain forest could be extinct by the end of the century.
- Only 625,000 African elephants roam the continent today — a reduction of more than 50% in the past ten years.

RAIN FOREST

- The average rain forest tree gobbles up an average of 50 pounds of carbon dioxide a year - as much as 30 pounds more than trees growing in other climates.
- The Amazon rain forest alone stores at least 75 billion tons of carbon in its trees.
- Almost 1/4 of the prescription drugs used in the U.S. contain materials derived from plants from the rain forest.
- Sixty percent of all plant species are found in tropical forests, which cover only.7% of the Earth's land surface.
- Two-fifths of the world's original rain forest has been destroyed mostly in the last 50 years.
- Chemists are looking at rain forest plants for prototypes for new medicines to fight cancer, heart

RAIN FOREST, continued on next page.

disease and other ailments.

- After agriculture, logging is probably the most serious threat to rain forests, perhaps reaching the ten million acre mark each year.
- Millions of acres of rain forest, mostly in Central and South America, are converted to cattle pasture each year.
- Up to 20 million acres of forest (nearly the size of West Virginia) are cleared each year in the tropics for agriculture.
- Every 15 minutes, more than one square mile of tropical rain forest is burned or bulldozed.
- The U.S. imports 15% of the world's tropical rain forest hardwood products such as teak, mahogany, rosewood and ramin.

LIST OF REFERENCES

- 50 Simple Things You Can Do To Save the Earth - the Earth Works Group
- World Wildlife Fund
- National Arbor Day Foundation
- Earth Day 1990
- National Wildlife Federation
- U. S. Environmental Protection Agency

B - LUNCH BUNCH

• **LUNCH COSTS**

HAVE STUDENTS LIST THE ITEMS THEY HAVE FOR LUNCH. EACH STUDENT CHOOSES ONE ITEM FROM HIS LUNCH AND TRACES ITS EFFECTS ON WILDLIFE. STUDENT MAKES A DIAGRAM OF THE LUNCH ITEM FROM ITS POINT OF ORIGIN, THROUGH PROCESSING, TRANSPORTATION AND DISTRIBUTION (STORE) TO HIS LUNCH BAG. AT EACH STEP OF DIAGRAM, CONSIDER ALL POSSIBLE IMPACTS ON WILDLIFE. THINGS TO CONSIDER: USE OF FERTILIZERS AND PESTICIDES GROWING, HABITAT LOSS, FUEL NEEDS AT EVERY LEVEL, PACKAGING, WASTE AND LANDFILL, ETC.

EACH STUDENT THINKS OF ONE CHANGE SHE/HE COULD MAKE TO REDUCE COST OF HIS LUNCH TO WILDLIFE. STUDENT TRIES OUT THE CHANGE AND REPORTS BACK: WAS THE CHANGE WORKABLE?

• **PLANT PIG OUT:**

CHILDREN BRING ONLY "PLANT FOOD" FOR LUNCH, NO MEAT. DISCUSS THE PROBLEMS OF RAISING MEAT VS. THE ENVIRONMENT.

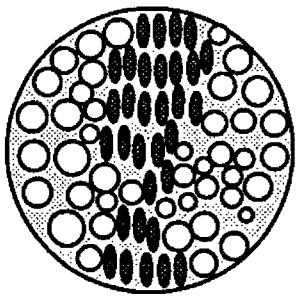
• **INCREDIBLE INSECTS:**

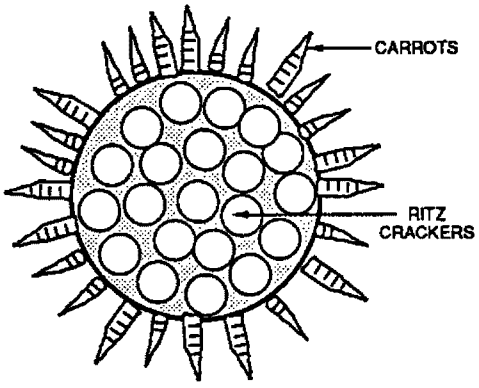
LOOK INTO YOUR LUNCH. WHAT TYPES OF FOOD IS DEPENDENT ON THE INSECTS? WHAT WOULD HAPPEN IF THERE WERE NO MORE INSECTS? WHICH FOODS WOULD DISAPPEAR?

LUNCH BUNCH

• **EARTH AND SUN REFRESHMENTS**

DECORATE A CAKE PAN AND PIZZA PAN (OR SERVING TRAY) TO RESEMBLE THE SUN AND EARTH.





PURPLE OR GREEN GRAPES COVER THE BOTTOM OF A CAKE PAN. PEANUTS ARE PLACED ON TOP OF THEM TO MAKE CONTINENTS.

ADAPTED FROM: LIVING LIGHTLY IN THE CITY BY SCHLITZ AUDUBON CENTER

• **LUNCH - WASTE WEIGH-IN**

CLASSES COMPETE TO WASTE THE LEAST AMOUNT OF FOOD AT LUNCH. EACH CLASS HAS A BUCKET INTO WHICH STUDENTS EMPTY LUNCH-TIME GARBAGE. BUCKETS ARE WEIGHED DAILY AND RESULTS DISPLAYED. PACKAGING MATERIALS MAY/MAY NOT BE INCLUDED IN THE WEIGH-IN. AFTER SET TIME PERIOD (WEEK?), CLASSES WITH THE LEAST WEIGHT, GREATEST IMPROVE MENT, ETC. ARE RECOGNIZED AND REWARDED.

• **LUNCH A LA COMPOST**

STUDENTS TAKE LEFT OVERS FROM LUNCH AND PUT IN A PLASTIC BAG OR CUP (TOPPED WITH PLASTIC TO HOLD IN HEAT). TO THIS ADD A LITTLE SOIL AND GRASS CLIPPINGS. SPRINKLE WITH WATER. (SEE COMPOSTING NEXT PAGE.) SET IN SUN TO HEAT UP. SHAKE UP BAG EVERY WEEK. CHECK IN A MONTH TO SEE WHAT HAS HAPPENED TO FOOD AND GRASS.

AFTER COMPOST IS READY, DIVIDE UP AND PLANT SEEDS.
SEE WHAT DEVELOPS.

LUNCH BUNCH

• **COMPOSTING**

COMPOSTING DEFINED: THE ART OF ECOLOGICALLY REUSING WASTE. COMPOSTING OCCURS IN NATURE, AND WHEN WE BUILD A COMPOST PILE WE ARE PROMOTING THE BIOLOGICAL DECOMPOSITION OF ORGANIC MATTER UNDER CONTROLLED CONDITIONS, AND DEMONSTRATING THE CONCEPT OF CYCLES AND CHANGE.

INGREDIENTS OF A COMPOST PILE

CARBON	NITROGEN	SOIL/MATERIALS
(DRIED MATTER)	(FRESH MATTER)	
DRIED LEAVES STRAW DRIED GRASS BRANCHES	KITCHEN SCRAPS MANURE LAWN CLIPPINGS LEAVES	SOIL INTRODUCES THE NECESSARY MICROORGANISMS FOR AEROBIC DECOMPOSITION. MINERALS ADD NUTRIENTS

KEEP COMPOST MOIST — ADD WATER WHEN NEEDED. TURN PILE FROM TIME TO TIME TO AID DECOMPOSITION.

DREAMSAND

• **LUNCH BAG:**

HAVE EACH STUDENT SELECT A LUNCH ITEM AND EXPLORE THE FOLLOWING:

WHO IS EATING BIRD, COW OR PIG FOR LUNCH? WATER? (RAW FRUIT OR VEGETABLE) (APPLE, ORANGE) SUN? (TRAPPED LIGHT, E.G., IN GREEN LEAVES) (BREAD) SOIL? (MINERALS IN FOODS) (CHICKEN, BUTTER) MANURE OR COMPOST? (USED AS FERTILIZER ON YOUR VEGETABLES)

C - PROJECTS

• **ADOPT AN ENDANGERED ANIMAL:**

RESEARCH AN ENDANGERED ANIMAL - FIND OUT ABOUT ITS LIFESTYLES, HABITATS AND PROBLEMS. TRY TO WORK ON A SOLUTION.

• **SCHOOLS HAVE GONE WILD:**

PLANT A MINI ECOLOGICAL HABITAT ON SCHOOL GROUNDS. FEED THE BIRDS - RECORD DATA ON WHICH ANIMALS FREQUENT FEEDER (INCLUDE INSECTS.) PROVIDE WATER. CHANGE FOOD FROM TIME TO TIME. WHAT HAPPENS?

• **GARBAGE GARDEN:**

AT HOME OR SCHOOL, DIG 7 HOLES (SIX INCHES DEEP) AND "PLANT" THE FOLLOWING ITEMS: STYROFOAM, PLASTIC STRAW, APPLE CORE, ORANGE PEEL, ALUMINUM CAN, PANTY HOSE AND COTTON. WATER ITEMS. COVER WITH SOIL. CHECK IN 1 MONTH, 2 MONTHS, ETC.

OR

PLANT SOME ITEMS IN A PAPER CUP; INCLUDE A SEED. KEEP BY THE WINDOW; SEE WHAT GROWS, WHAT BIODEGRADES - WHAT DOESN'T.

• **BUSINESS PARTNERS:**

SELECT A BUSINESS IN CINCINNATI - WRITE TO THEM - HOW ARE THEY HELPING WITH THE ENVIRONMENT - WHAT ELSE COULD THEY DO - GUEST SPEAKERS - TOUR BUSINESS PLACE.

• **WRITE IN**

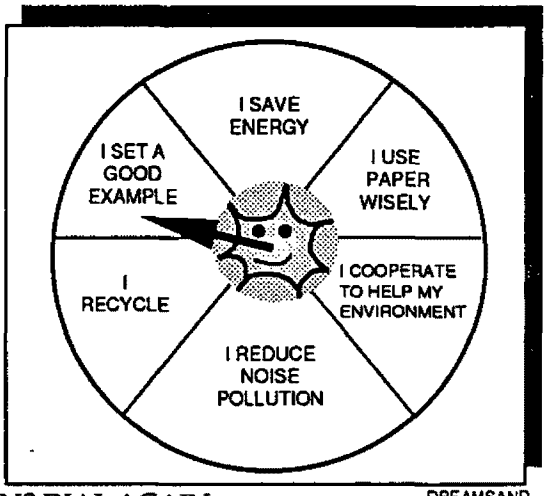
CHILDREN PICK AN ENVIRONMENTAL ORGANIZATION TO WRITE TO. ASK FOR INFORMATION ON HOW THEY CAN HELP. WHEN ALL INFORMATION IS RECEIVED CHILDREN WILL DEVISE THEIR OWN "HOW I HELPED" PROGRAM. PRESENT PROGRAMS TO THE CLASS DEMONSTRATING PROCEDURES THEY'VE LEARNED ABOUT.

PROJECTS

• ***YES, I CAN!* GAME**

PURPOSE: CHILDREN WILL ACT TO SAVE ENERGY, RECYCLE, AND SET GOOD EXAMPLES FOR LIVING ENVIRONMENTALLY.

CHILDREN TAKE TURNS SPINNING A GAME SPINNER (TEACHER MAKES, OR ADAPTS AN OLD GAME SPINNER) TO GET AN ACTION CATEGORY. FOR EACH CATEGORY, TEACHER PREPARES LIST OF POSSIBLE PROJECTS TO BE DONE AT HOME OR SCHOOL, EACH WITH POINT VALUE. STUDENT CHOOSES A PROJECT FROM THE APPROPRIATE LIST AND DOES IT, EARNING POINTS. WHEN A DESIGNATED NUMBER OF POINTS HAS BEEN EARNED IN A CATEGORY, STUDENT IS AWARDED A "BADGE" TO WEAR (I'M AN ENERGY SAVER, ETC.) WHEN A PROJECT IS COMPLETE, STUDENT SPINS DIAL AGAIN.



PROJECTS COULD BE ENVIRONMENTAL ACTIONS (PICK UP SCHOOL YARD LITTER, USE BOTH SIDES OF A PAPER, ETC.) OR AWARENESS ACTIVITIES (MAKE A POSTER, POEM, ETC. OF WAYS TO SAVE ENERGY).

• **BACK PACK RAT**

PACK RATS COLLECT OBJECTS SUCH AS SHINY METALS, PLASTIC, ETC., TO LINE THEIR NESTS. COLLECT ALL THE LITTER YOU FIND OR GENERATE IN A WEEK'S TIME, INCLUDING PAPER, POP CANS, FOOD AND CANDY WRAPPERS, AND PUT IT IN YOUR BACK PACK. CARRY YOUR BACK PACK TO AND FROM SCHOOL. HOW MANY DAYS DID IT TAKE TO FILL UP? AT THE END OF THE WEEK EVERY ONE EMPTIES THEIR PACKS AND EXAMINES THEIR TRASH. WHAT ITEMS ARE THROWN AWAY IN THE GREATEST QUANTITY? WHAT COULD BE RECYCLED?

RECYCLING SELF SURVEY

TAKE THIS SURVEY TO FIND OUT YOUR RECYCLING HABITS.
DO YOU?

	CIRCLE THE NUMBER		
	NEVER	*SOMETIMES*	*OFTEN*
1. SAVE YOUR POP CANS FOR RECYCLING?	1	2	3
2. REMIND YOUR PARENTS TO REUSE BROWN PAPER BAGS FOR GROCERIES?	1	2	3
3. SAVE PASTIC MILK CONTAINERS FOR RECYCLING?	1	2	3
4. USE BOTH SIDES OF WRITING & DRAWING PAPER?	1	2	3
5. USE DISHES INSTEAD OF PAPER PLATES?	1	2	3
6. USE CLOTH NAPKINS & TOWELS?	1	2	3
7. USE SILVERWARE INSTEAD OF PLASTIC?	1	2	3
8. USE A GLASS MUG INSTEAD OF STYROFOAM CUPS?	1	2	3
9. BUY PRODUCTS THAT CAN BE REUSED?	1	2	3
10. MAKE SOMETHING USEFUL FROM OLD THINGS?	1	2	3
11. THINK ABOUT WHERE THE GARBAGE GOES AFTER IT LEAVES YOUR HOME?	1	2	3
12. SWAP MAGAZINES WITH YOUR CLASSMATES?	1	2	3
13. THINK OF WAYS YOUR FAMILY REDUCES GARBAGE?	1	2	3
14. SAVE ALUMINUM FOIL FOR REUSE?	1	2	3
15. SAVE NEWSPAPERS FOR RECYCLING?	1	2	3

DREAMSAND

TOTAL SCORE _____

THE HIGHER THE SCORE, YOU ARE BECOMING A GOOD RECYCLER.

15 OR LESS - A POOR RECYCLER

16-25 - YOU NEED TO DO MORE RECYCLING

26-45 - YOU ARE A GOOD RECYCLER

Earth Day 1990

ENERGY HOME SURVEY—GRADES K-3

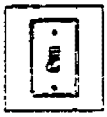
Name: _____

Choose an hour block of time during which you and your child will record all the ways that you use energy Go about your normal activity but keep this survey sheet with you. Record every time you turn on a light, use an appliance, talk on the phone, etc. check those that were used during a one hour block of time.

The following list identifies some typical ways energy is used in the home. Use it as a starting point to keep track of your energy use. Add to the bottom of the list other ways you use energy. Put a check, or have your child check the appropriate time you completed this survey:

☐ morning ☐ afternoon ☐ night

Typical home energy uses:


lights _____


hot water _____


home heating _____

Appliances


television _____


radio _____


record player, stereo _____


telephone _____


hair dryer _____


stove and/or oven _____


microwave _____


refrigerator _____


washer _____


dryer _____


toaster _____

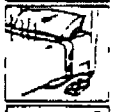

blender, or food processor _____


garbage disposal _____


dishwasher _____


clock _____


can opener _____


electric blanket _____


iron _____


typewriter, computer _____


vacuum cleaner _____


air conditioner _____

Other: Draw pictures on back.

Earth Day 1990

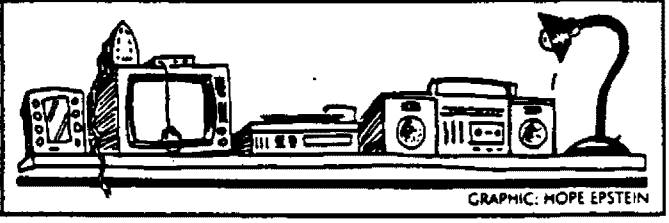
ENERGY HOME SURVEY—GRADES 4-6

HOME APPLIANCES

Name: _____

My estimate of the number of appliances in my home: _____

List all the appliances you have at home. Be sure to record the number of each kind that you find.

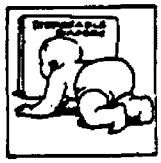
Example: ELECTRIC CLOCKS IIII	
	

Earth Day 1990

HOME RECYCLING SURVEY—GRADES K-6

Name: _____

1. Put an X by the picture of those items that go into your garbage.

- ❑  cans (aluminum and/or tin)
- ❑  glass bottles
- ❑  paper
- ❑  aluminum foil
- ❑  styrofoam (containers and packing materials)
- ❑  cardboard
- ❑  disposable diapers
- ❑  plastic containers
- ❑  newspapers
- ❑  grocery bags (paper or plastic)
- ❑  egg cartons

2. Which items (of those listed above) could be recycled—by you or someone else?

_____

_____

_____

_____

3. Does your town or city have a place to recycle any of these items?

___Yes ___No ___I don't know

4. Where does your garbage go once it leaves your house? (Draw a picture or explain in words on the back of the page.)

Earth Day 1990

CONTINUATION PAGE—GRADES 4-6

5. a) Which items listed in question one could be saved and made into a new product?

5. b) If you are not sure, how might you find out?

6. What are the benefits and drawbacks of recycling to your family?

Benefits	Drawbacks

7. List five products that your family purchases which produce "instant garbage." They may come packaged in such a way that you throw away packaging as soon as you open them or they may be disposable so that you throw them away after using them only one time. Can you think of any alternatives to these products?

Instant Garbage	Possible Alternative

8. How does it help the environment to reuse things?

Earth Day 1990

HOME WATER SURVEY—GRADES K-6

Name: _____

1 What is your age?

2. Are you male or female?

3. Name five ways that you use water every day.

_____

_____

_____

_____

_____

4. What is one of your favorite activities that involves water?

_____

_____

5. Where does your water come from?

_____

_____

_____

6. a). Who do your think owns the water in a river or lake?

_____

b). In the ocean?

_____

_____

7. Since you and your family pay for the water you use, do you believe you own that water and can do anything you want with and to it? Why or why not?

_____

_____

8. Do you think people can hurt other living things by what they put in water?

___ yes

___ no

___ I don't know

Earth Day 1990

CONTINUATION PAGE—GRADES 4-6

9. What do you think is the biggest problem concerning water in our community? (Check one)

___ A. Not enough water

___ B. Too much water

___ C. Water pollution

___ D. Water is wasted

___ E. Other problem

_____

___ F. There is no problem

10. On a scale of 1 to 5, how much of a problem would you say water quality is in our community? (Put an X on the line.)

not at all very much so

1 2 3 4 5

_____

11. Suppose city planners believe that the population of your community will continue to grow, doubling in the next 20 years. The current water supply simply won't support that many people at the current levels of use. What do you think your community should do to prepare for this increase in water need?

___ A. Get more water by building a dam.

___ B. Get more water by buying water from another community.

___ C. Pass laws requiring people and businesses to use less water.

___ D. Get people to use less water by charging more for it, and save the extra money charged to pay for water later when the population increases.

___ E. Other.

_____

_____

_____

_____

_____

_____

Earth Day 1990

HOME TOXICS SURVEY—GRADES K-6

Name: _____

1. What is your age?_____ Are you male or female?_____

2. What do you think of when you hear the word toxic? (See the explanation at the bottom of page if you are unsure of what the word "toxic" means.)*

3. Which of the following do you use? Which of the following do you consider toxic?*

The *laundry detergent* your parents use to wash clothes.

_____ Use _____ Consider Toxic

The *baking soda* your parents use in cooking.

_____ Use _____ Consider Toxic

The *cleanser* your parents use to clean the sink and bathtub.

_____ Use _____ Consider Toxic

The *air freshener* your parents use to make the air in your house smell fresh.

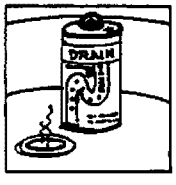
_____ Use _____ Consider Toxic

The *furniture polish* your parents use to clean and shine furniture.

_____ Use _____ Consider Toxic

The *ant spray* your parents use to kill ants in and around the house.

_____ Use _____ Consider Toxic



The *drain cleaner* your parents pour into sink and bathtub drains.

_____ Use _____ Consider Toxic

The *hair spray* some family members use to keep their hair in place.

_____ Use _____ Consider Toxic

The *glass cleaner* your parents use to clean windows and mirrors.

_____ Use _____ Consider Toxic

The *salt* you use to flavor food.

_____ Use _____ Consider Toxic

4. When do you think it is okay to use something that is toxic?

5. What room in your home do you think contains the most toxics?

*A toxic is any substance that is capable of harming a person if ingested, inhaled, or absorbed through any body surface.

Earth Day 1990

CONTINUATION PAGE—GRADES 4-6

6. Which statement best describes your home?

_____ There are no toxics in my home.

_____ There are some toxics in my home.

_____ I do not know if there are toxics in my home.

7. Would you want to be told if something you are about to buy might be toxic?

_____ Yes

_____ No

_____ Sometimes

For Adults

8. Do you think that people who work where there are toxics should be told this when they are hired?

_____ Yes

_____ No

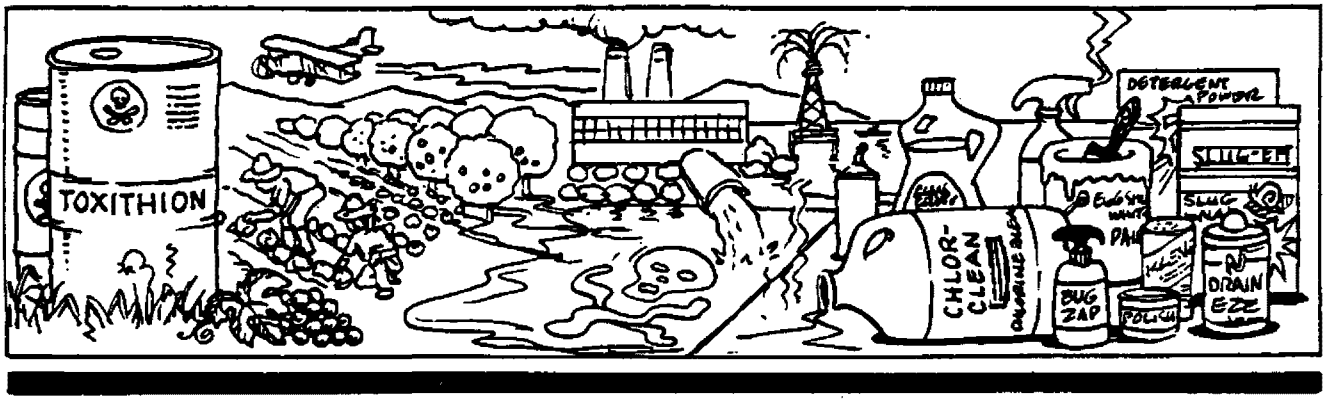
_____ Sometimes

9. Do you think individuals should decide whether to buy and use toxics, or do you think the government should make it illegal to sell toxics?

_____ Individuals should decide.

_____ Government should make it illegal.

_____ I don't know.



Who Can Make The Best Recycled Paper?

Materials

Wire screen pieces (about 25 cm X 32.5 cn each)

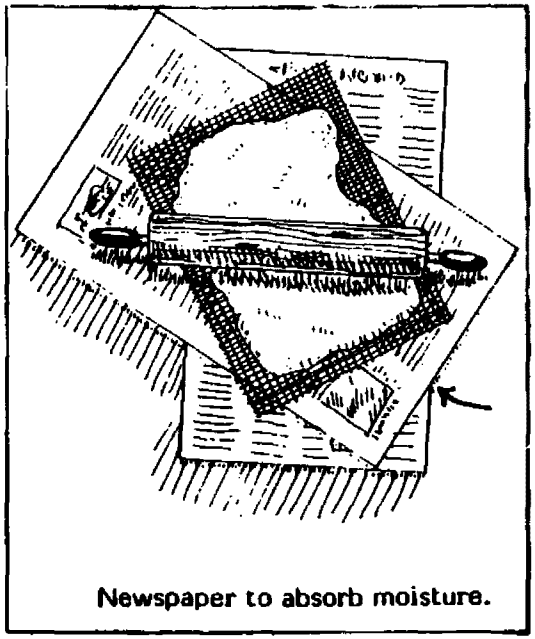
Blender

Old newspapers

Rolling pin

Starch supension*

Felt pieces** (about 23 cm X 32.5 cm each)



Newspaper to absorb moisture.

Set Up Your Experiment

Cut or tear a newspaper page into small pieces and soak them in water.

Pour off the excess water and place the pieces in a blender. Add three tablespoons of starch suspension and blend at high speed until the mixture looks like thick soup.

Quickly pour the mixture onto a piece of wire screen, spreading it evenly.

For a smoother-textured paper, allow the mixture to drain on the screen. Then cover it with a piece of felt.

To remove excess liquid, roll the rolling pin over the mixture while it is on the screen. Then, cover it with a piece of felt.

Turn the screen over on the felt and peel the screen off carefully. Cover the paper with another piece of felt before rolling it.

To remove excess liquid, roll the rolling pin over the mixture while it is on the screen. Peel off the wet paper and let it dry overnight.

*Make a Starch Suspension

Combine one cup of cornstarch with two cups of water. Mix thoroughly before using.

**optional

Set Up Your Contest

Now that you know how to make paper, decide on the rules for the class.

Official Rules

Can you use newspaper only? Are other types of papers allowed, such as homework?

Can you use only the standard starch suspension? Are other mixtures allowed?

What is the minimum or maximum paper thickness?

May colors be added?

How many pieces of paper should be made by each student?

Are teams allowed to participate?

Draft-O-Meter

OBJECTIVES:

The students will conduct investigations to determine energy loss in a given area. See ENERGY RESOURCES matrix for background information.

MATERIALS:

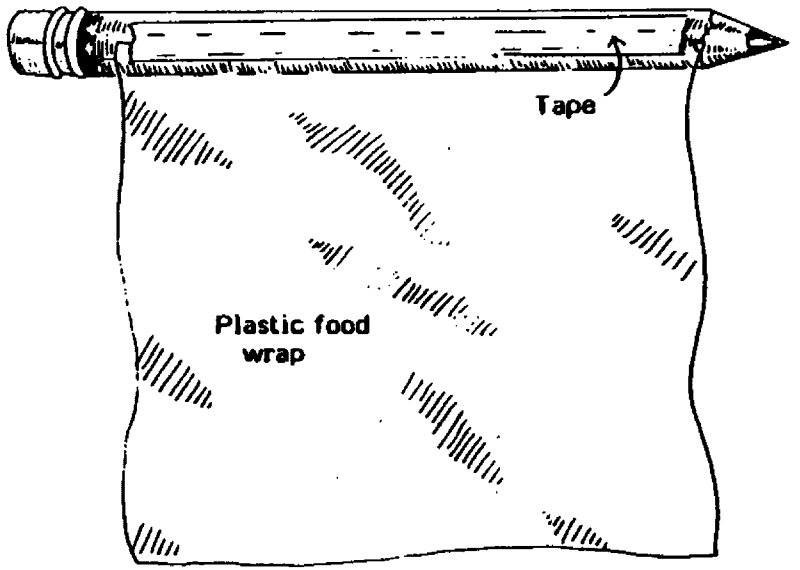
pencil
tape
plastic food wrap
thermometers

PREPARATION:

Cut a 12 cm by 25 cm strip of plastic food wrap. Tape one edge of the wrap to a pencil and let the rest hang freely. Blow the plastic wrap gently and note how sensitive the wrap is to air movement. Drafts mean either a loss of heat in winter or a loss of "cool" in summer.

PROCEDURE:

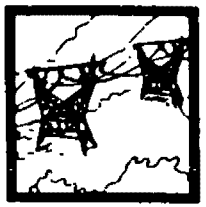
Divide the students into groups of three. One will record the data, one will read the thermometer, and one will use the draft-o-meter. Have the students test for drafts. Predict if there is or is not a draft before testing. Collect measurements around the school. Where was the most loss? Why? What could be done to prevent it?



FOLLOW-THROUGH:

Conduct this investigation in a local business and recommend to the owner ways to decrease drafts and conserve energy.

Insulation

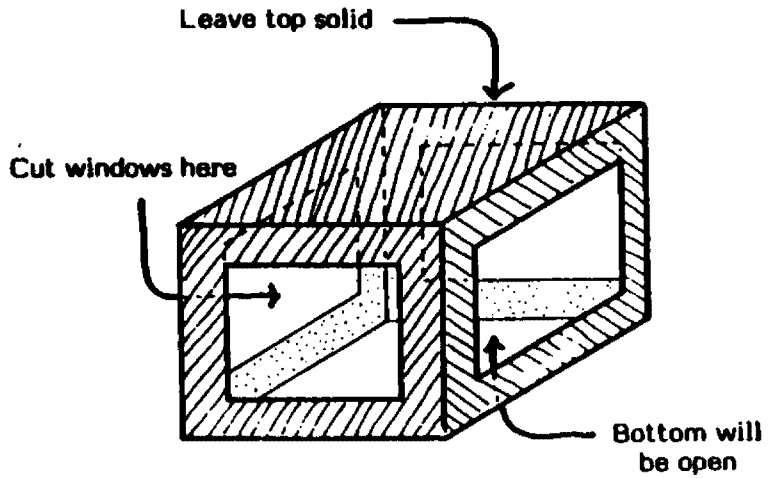


OBJECTIVES:

The student will experiment with materials to determine the best insulator of heat. See ENERGY RESOURCES matrix for background information.

MATERIALS:

100-watt light bulb in a ceramic socket
various materials:
wood, aluminum foil, glass, plastic, newspaper, cloth, other
thermometers
cardboard box
masking tape
clock



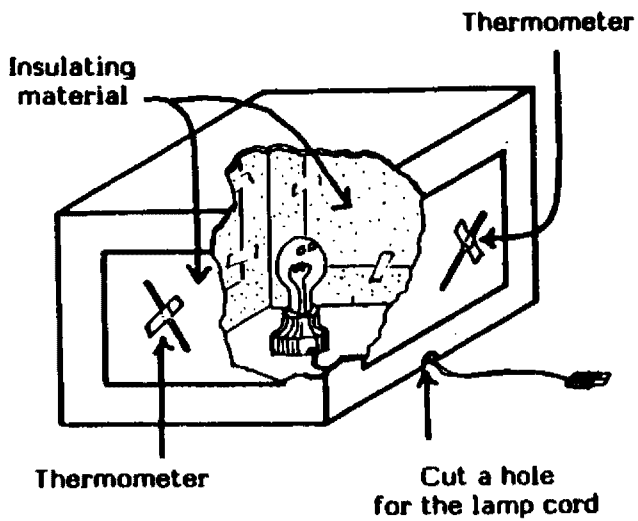
PREPARATION:

Prepare the box by cutting windows in all four sides as shown below. Place the lamp in the center of the box; plug it in and test the lamp.

Read the activity "Draftometer."

PROCEDURE:

Allow the students to work in groups. Provide as many boxes as possible. Have each group decide which materials they would like to use and predict the insulating ability of



that material. Tape thermometers to the outside of the material and turn the lamp on for 5 minutes. Record the rise in temperature for each material (see sample table).

Ask what insulation is. Are some materials better insulators of heat than others? Which of the materials was the best insulator? Why is full insulation now required in new houses?

FOLLOW-THROUGH:

Try making "double layers" of insulation materials with a dead air space between the layers. How does it affect the insulating ability of the material?

Student Data Chart

Material:	Temperature °C	
	Before	After
Wood		
Aluminum Foil		
Fiberglass		
Glass		
Metal		
Newspaper		
Cloth		

Sulfur Dioxide Dangers

OBJECTIVES:

The students will observe the effects of on plant life. See AIR RESOURCES matrix for background information.

MATERIALS:

large clear plastic bag
tape
green plant in a pot
small beaker
sodium nitrite (2g)
sulfuric acid (5%)

PREPARATION:

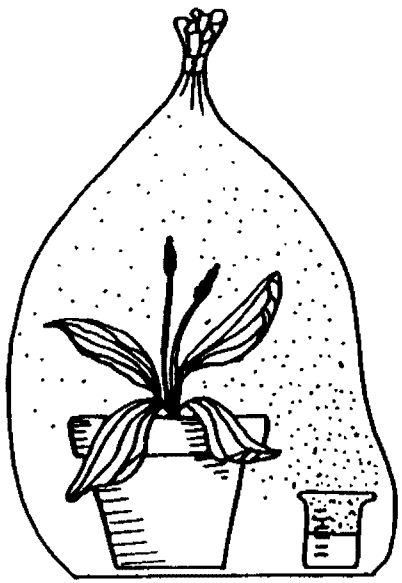
Sulfur dioxide, besides having a noxious smell, can interfere with photosynthesis. In this demonstration, there will be a high concentration of sulfur dioxide gas in a closed container. Because the amount of gas in the bag will be high, effects to the plant will be immediate and severe.

We suggest that the teacher should do this activity as a demonstration only!

PROCEDURE:

Take the class outside for this demonstration. Place 2 gm of sodium nitrate in the small beaker and place the beaker and the potted plant inside the plastic bag. Add 2 ml of 5 percent sulfuric acid to the small beaker and seal the bag shut with the tape. If sulfur dioxide gas leaks from the bag (smells like rotten eggs), move the class away until the reaction is completed. Leave the plant in the closed bag at least 10 minutes. Cut the bag open and allow the gas to disperse. After the plant has aired out, take it back to the classroom. Be sure to wash your hands.

Allow the class to observe the plant for 2 days and keep a log of their observations. Ask them to note color, leaves, and general health. Provide a second similar plant to use for comparison. Discuss with the students why sulfur dioxide emissions are regulated to stay below certain levels. Why does TVA maintain careful watch on sulfur dioxide produced in the Tennessee Valley?



FOLLOW-THROUGH:

Do the activity "WEATHER WATCHERS" in this section. Find out how sulfur dioxide is related to "acid rain."

How does this demonstration relate to "indoor" air?

The Forest Blanket

OBJECTIVES:

The students will perform an activity to demonstrate how forest cover helps reduce erosion. See FOREST RESOURCES matrix for background information.

MATERIALS:

long narrow box (wood or cardboard)
plastic bag (to line the box)
soil
humus (the upper layer of soil in a forest including leaf materials)
bucket or water hose
water

PREPARATION:

Soil erosion is a serious problem for several sectors of our economy today. Topsoil loss erodes the productivity of our farm land. This soil spoils drinking water and takes away from the scenic beauty of the environment. Sedimentation can clog transportation channels for barges and fill reservoirs behind our power generating hydroelectric dams.

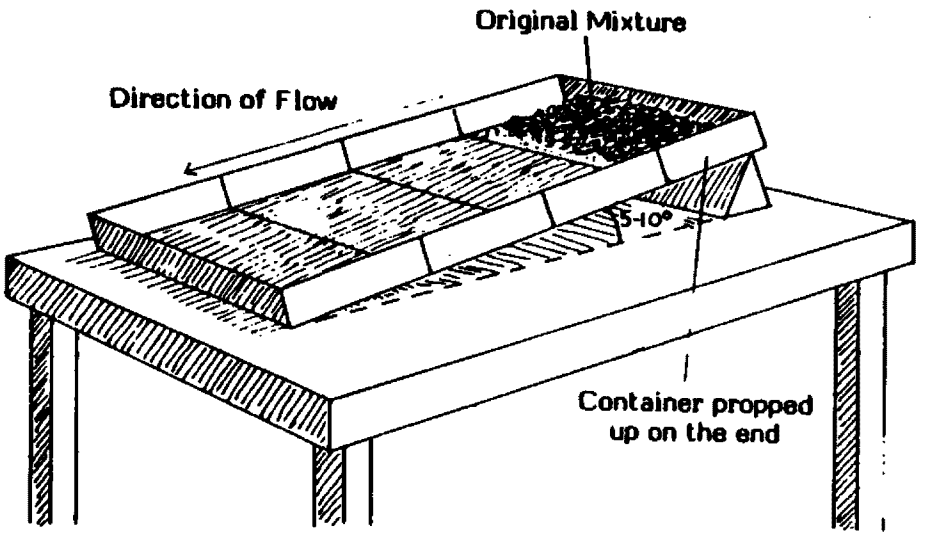
Examples of soil erosion are easy to locate. Visit a new building construction or a freshly plowed field and note the gullies that form after a rain.

PROCEDURE:

Allow the students to set up the box outside as shown in the diagram following. Line the box with plastic and fill it with fine soil. Prepare a second box in the same fashion. In the second box, place a layer of humus from the forest on top of the soil layer.

Vigorously pour water from a bucket or hose on each box. Collect the run-off water from each and observe the color and sediment. (See activity "WHERE'S THE TOPSOIL?".) Students should note and record differences in the two boxes.

Discuss the differences noted in the two boxes. Why did these things occur as they did? Why is the forest important in preventing soil erosion?



FOLLOW-THROUGH:

Perform the activity again but change some of the variables; for example:

- use a different soil type
- increase or decrease the slope
- use other "blanket" materials
- use contour and parallel plowing

How does each of these variables affect the amount of soil erosion that takes place?

Find examples of soil erosion in your community and work as a class to create and implement a solution.

D - INDOOR INVESTIGATIONS

• **HANGING BY A THREAD:**

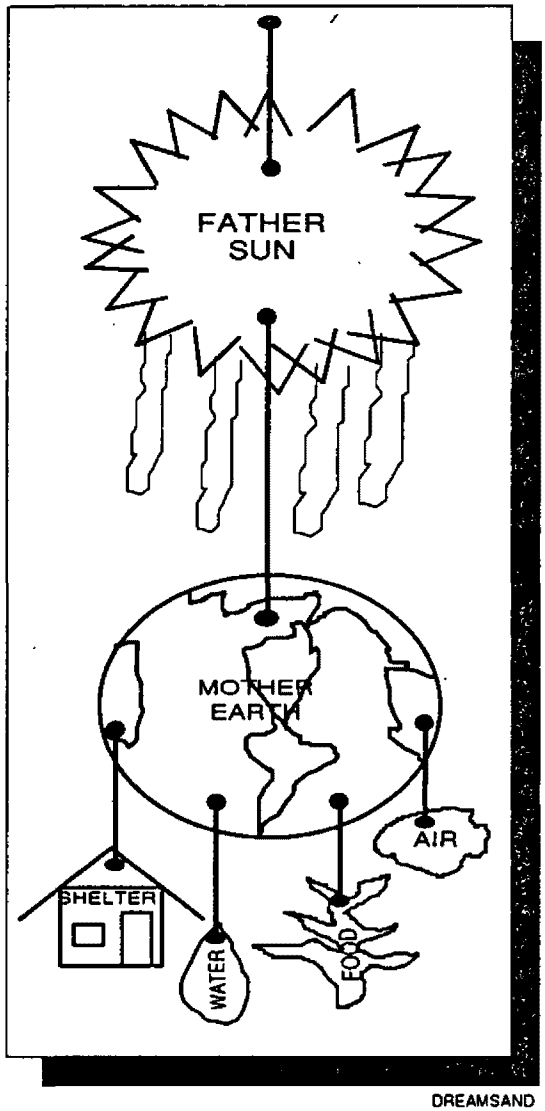
HANG MOTHER EARTH/FATHER SUN MOBILES IN CLASSROOM. PIECES ARE MADE OF CONSTRUCTION PAPER, RIBBON AND STRING.

• **HANG UPS!**

USING HANGERS, TIE DRAWINGS OF ANIMALS INVOLVED IN A FOOD CHAIN (FROM THE CEILING.) CLOSEST TO THE HANGER ARE A VARIETY OF PLANTS, THEN HERBIVORES, FIRSTLEVEL CARNIVORES, SECOND LEVEL CARNIVORES, THEN DECOMPOSERS.

FOR EXAMPLE, GRASSES, GRAINS, SEEDS —> MICE, RATS —> SNAKES, WEASEL —> GREAT HORNED OWL —> MAGGOTS, BACTERIA.

DESIGN FROM: LIVING LIGHTLY IN THE CITY BY SCHLITZ AUDUBON CENTER.

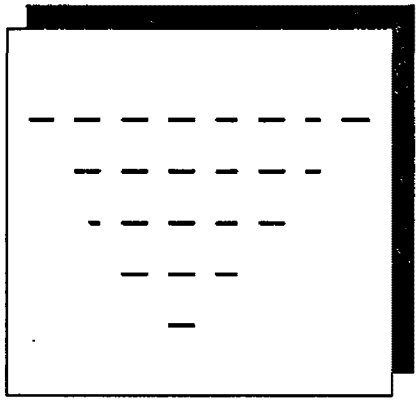


DREAMSAND

• **POSTER, PHOTO ESSAY CONTESTS:**

1. SOLUTIONS FOR POLLUTION (POLLUTION CONTROLS)
2. SUPER SAVERS (RECYCLING)
3. DON'T CEMENT THE ENVIRONMENT (ECOLOGICAL HABITATS)

• **PESTICIDE PYRAMID:**



DIVIDE STUDENTS INTO PLANTS (8+ PER 15 STUDENTS), HERBIVORES (+ 4 PER 15 STUDENTS), FIRST LEVEL PREDATORS (+ 2 PER 15 STUDENTS), TOP LEVEL PREDATOR (1 PER CLASS). HAVE STUDENTS STAND IN LINES, MAKING PYRAMID SHAPE, WITH PLANTS IN FRONT ROW.

TEACHER EXPLAINS HER PLANTS WERE SICKLY AND ATTACKED BY INSECTS, SO SHE SPRAYED THEM WITH A PERSISTENT (LONG-LASTING) CHEMICAL. PLACE NAPKIN ON THE HEAD OF EACH SPRAYED PLANT - A SIGN IT'S PROTECTED.

HAVE HERBIVORES "EAT" PLANTS BY SNATCHING NAPKINS OFF PLANT HEADS AND PILING THEM ON THEIR OWN. HERBIVORE WITH NO "HATS" HAS STARVED.

1ST LEVEL PREDATORS EAT HERBIVORES SAME WAY, THEN FINAL PREDATOR EATS OTHERS.

COUNT THE NAPKINS ACCUMULATED ON THE HEAD OF THE TOP PREDATOR. HOW DID IT GET SO MUCH OF THE CHEMICAL IN ITS SYSTEM? WHAT MIGHT HAPPEN TO IT AS A RESULT OF PESTICIDE ACCUMULATION?

• **ICKY OR INCREDIBLE?**

EACH STUDENT PICKS AN ANIMAL (INSECTS INCLUDED) THAT HE OR SHE FINDS DISGUSTING. RESEARCH IT WITH A PARTNER. ONE CHILD MUST BUILD A CASE (LIKE A LAWYER) DEFENDING THIS ANIMAL, TELLING WHY IT IS SO USEFUL. THE OTHER CHILD MUST PROSECUTE, TELLING THE AUDIENCE ITS BAD POINTS. CLASS THEN VOTES ON THE ANIMAL, PUTTING IT IN THE ICKY OR INCREDIBLE CATEGORY. THIS IS FUN ACTIVITY, ESPECIALLY FOR BUDDING TRIAL LAWYERS.

• **DECISIONS:**

IN A BOX, PUT SOME PROBLEMS FACING PEOPLE IN EVERYDAY LIFE INVOLVING ENVIRONMENTAL PROBLEMS. LET THE CHILDREN DECIDE HOW TO SOLVE THEM. WRITE DOWN SOLUTIONS ON PAPER AND POST.

• **DROWNING IN LITTER:**

FOR A PRE-DETERMINED LENGTH OF TIME, INSTRUCT THE SCHOOL'S CLEANING STAFF TO NOT DO YOUR CLASSROOM. STUDENTS CAN EITHER CONTINUE TO TOSS PAPER INTO THE OVERFLOWING TRASH CAN (AND KEEP THE PILE A BIT CONFINED) OR TOSS IT ON THE FLOOR (AND SPREAD THE MESS OUT). AFTER ABOUT 2 WEEKS, THE ROOM SHOULD GRAPHICALLY ILLUSTRATE THE DEGREE OF WASTE. ASK STUDENTS HOW THEY FEEL ABOUT LIVING IN THE MIDST OF GARBAGE. DISCUSS: WHERE DOES OUR GARBAGE GO? WHAT HAPPENS WHEN WE RUN OUT OF PLACES TO PUT IT? HAVE A GRAND CLEAN-UP. DISCUSS WAYS TO REDUCE WASTE IN THE CLASSROOM; TRY TO PUT SOME REFORMS INTO PRACTICE. IF POSSIBLE, TAKE THE ACCUMULATED PAPER TO A RECYCLING CENTER. TEACHER'S OPTION: TELL THE CHILDREN AT THE BEGINNING WHAT THE PROJECT WILL BE, OR KEEP THEM UNINFORMED ABOUT WHY THE GARBAGE IS ALLOWED TO ACCUMULATE UNTIL THEY ASK.

• **RAIN FOREST RIP-OFF:**

RAINFORESTS ARE VANISHING AT AN ASTOUNDING RATE (100 ACRES/MINUTE.) NOT ONLY ARE WE LOSING VALUABLE PLANTS IN THIS PROCESS BUT ANIMALS CANNOT SURVIVE WHEN PLACED IN OVERCROWDED SITUATIONS. TO DRIVE THIS POINT HOME MAKE A SMALL SQUARE WITH MASKING TAPE ON THE FLOOR (ANY SIZE AS LONG AS THE STUDENTS ARE CROWDED.) NEXT, EXPLAIN THAT A GROUP OF STUDENTS WILL DO THEIR SCHOOL WORK WITHIN THE CONFINES OF THE SQUARE FOR 1/2 HOUR. TALK ABOUT THEIR FEELINGS AND DIFFICULTIES AFTER THE EXERCISE. HOW DOES THIS RELATE TO ANIMALS THAT LOSE THEIR HABITAT? WHAT HAPPENS WHEN ANIMALS AND PEOPLE ARE OVERCROWDED

• **ENERGY ALLOWANCE:**

ISSUE EACH CHILD THE SAME NUMBER OF ENERGY ALLOWANCE STICKERS SMALL GUMMED STARS, CIRCLES, ETC.) GIVE EACH CHILD A PAPER WITH PICTURED ALTERNATIVES FOR ACTIVITIES (LINE DRY VS. MACHINE DRYER FOR CLOTHES; WALK OR BIKE VS. CAR RIDE; HAND WASH VS. MACHINE WASH DISHES; READ VS. TV WATCH, ETC., ETC.). TELL THE CHILDREN (OR LET THEM MAKE UP IN PROGRESSIVE-STORY FASHION) A STORY IN WHICH CHILDREN DO THE ACTIVITIES AND MAKE CHOICES. EACH CHOICE HAS AN ENERGY COST WRITTEN BY IT, FROM FREE TO A FEW POINTS TOO MANY, BASED ON ENERGY REQUIREMENTS. AS CHILDREN MAKE CHOICES, THEY STICK THE REQUIRED NUMBER OF STICKERS TO THEIR CHOICE. DOES THEIR "ENERGY ALLOWANCE" LAST THROUGH THE STORY? WHAT ENERGY-SAVING CHOICES CAN THEY MAKE AT HOME?

• **QUIET TIME: IF I WERE . . .:**

STUDENTS CHOOSE TO BE A PARTICULAR PLANT OR ANIMAL IN THEIR IMAGINATIONS. DIM THE ROOM LIGHTS, AND LET STUDENTS LISTEN TO A RECORDING OF MUSIC (CLASSICAL MUSIC WITH THUNDERSTORMS LIKE BEETHOVEN'S 6TH SYMPHONY, POET & PEASANT OVERTURE, GRAND CANYON SUITE WORKS WELL, AS DOES SOME ELECTRONIC MOOD MUSIC WITH ENVIRONMENTAL THEMES) OR NATURAL "MOOD" SOUNDS. AS THEY LISTEN, THEY IMAGINE THAT THEY ARE THAT PLANT OR ANIMAL GOING ABOUT ITS LIFE.

AFTERWARDS, SHARE STORIES. WHAT HAPPENED? HOW DID THEY FEEL?

OLDER STUDENTS COULD WRITE OUT THE STORIES AND COMPILE THEM INTO A BOOK.

RECYCLING PAPER

INTERMEDIATE

Objectives

Students will be able to *describe* physical changes required for the recycling of paper. Students will improve their ability to *manipulate materials and equipment.*

Method

Students use screens, blender, scissors and other equipment to make rough recycled paper sheets from a paper pulp mixture. They read and *follow directions* to guide them through the process.

Duration: two to three periods if doing the basic procedure

Setting: classroom

Subject: Science

Curriculum Reference: 1.1, 1.5

Preparation

Numerous items will be needed and alternative ways of doing the activity require different items. So read over the steps in the **Procedures**, including "ALTERNATIVE SUGGESTIONS", to decide which items you want to use from the list below. Items for the basic procedure are listed below with alternative or additional supplies listed in parenthesis.

- a container for pulp: dish pan, wash basin, bucket or large bowl
- something to grind paper into pulp: electric blender (egg beater—this enhances hands-on approach)
- scrap paper: white, uncoated loose-leaf notebook paper and paper towels work fine (Newspaper is easy to pulp but ink causes final product to be black. However, you could experiment adding 25% household bleach to the pulp solution. Bleach will also promote breakdown of heavier notebook and copy papers. Make sure you, and not students, handle the bleach in demonstration fashion if this is done.)
- wooden framed screen representing a paper mold: about 6" square, could use nylon window screen and affix to back of wooden frame with staples or tacks. An old picture frame will do.
- (instant starch can be added to pulp mixture to make paper stronger, but is not necessary)
- scrap paper to dry recycled paper on (could use plastic wrap)
- (non-toxic food dye to add coloring)
- warm water in plastic jug or other container
- something to put pressure on wet pulp to squeeze out water: a piece of paper pressed against screen, or a wooden block made to fit over screen (You could also lay paper between two sheets of plastic and move rolling pin or pipe over it.)

Set up workstation(s) for students to work in pairs. A model workstation, in process order, could be as follows: aprons—box of scrap paper to be recycled—jug with warm water beside blender—container for pulp runoff and screen molds—scrap paper or wooden block—drying area. Cover all areas with a good thickness of newspaper to protect surfaces, this is a messy, but worthwhile, activity.

Vocabulary

paper pulp, physical properties, process, recycle

Handout

Instructions For Recycling Paper

Procedures

1. Explain how recycling requires physical changes in matter. What must happen to old paper to make new paper out of it? (It must be broken down into tiny fibers and mixed in water to make pulp.) The physical properties of paper such as its light weight, its fibrous texture and

its ability to retain moisture (or other chemicals) in a mixture enable paper to be recycled.

2. Divide students into pairs or groups of pairs and set up workstations as previously mentioned.

3. Give each pair of students an instruction sheet to follow for making paper. Go over the instructions once and ask if there are any questions. (If you have modified the process, you may need to modify this sheet, make one of your own, or explain process orally.) Have students put on aprons before beginning.

   TIPS: Each pair of students should make two samples of paper so each student has a sample. As the pulp container fills up with pulp the screens could merely be dipped in this solution instead of making more pulp. However, this diminishes the hands-on nature of the activity through the use of the mixing-device. Therefore, as the container fills up you could collect the pulp and store in freezer for future use. REMEMBER: do not pour pulp down a sink drain, wrap in paper and throw in the trash if you want to dispose of it.

4. When paper is dry have students make pictures on them with crayons or magic markers and tack on a bulletin board. REMEMBER: the paper students will have made is not slick, shiny white paper they usually write on. To achieve this quality at a paper recycling plant better machines are used and some chemicals are added to the pulp mixture.

5. In general, the recycled paper made in the classroom is thicker, darker and grainer than ordinary writing tablet paper. However, this classroom recycled paper may have special qualities for other purposes, such as packaging for eggs or cereal. You could have students make many pieces of recycled paper so they can experiment with scissors, glue, tape, etc. to see who can make the best box to protect an egg or to package some other item.

ALTERNATIVE SUGGESTIONS

Changes in Equipment

- Use egg beater instead of blender to make pulp. Be sure to tear scrap paper into very small pieces and to let these pieces soak overnight before beating.
- To promote paper breakdown when using a covered blender, add 25% household bleach to the pulp mixture. You may want to add this yourself as it can be harmful if not added properly by students.
- Instead of using paper or a wooden block to press water out of pulp on the screen, use a rolling pin, by placing wet pulp between two sheets of plastic.
- One way to enhance drying time is to place wet sheet of paper pulp between two sheets of blotter paper and iron with a clothes iron.
- If you want to demonstrate the de-inking process in newspaper recycling, add bleach to a pulp solution of strips of newspaper and water. Then strain pulp squeezing out ink in liquid and blend in water again.

Experimenting to Achieve Different Results

Discuss with students how various physical characteristics of recycled paper, such as thickness, color, texture and strength could be changed.

- Thickness: Increasing or decreasing the amount of pulp poured onto the screen will affect thickness (so will pressure applied to rolling pin if used to press moisture out). Increasing or decreasing the amount of scrap paper in water mixture will also have an effect.
- Color: To achieve a specific color recycle construction paper scraps of the color you desire. Or, add non-toxic fabric dye to pulp mixture.
- Texture and Strength: Add two tablespoons of starch to pulp mixture to see what happens.

Evaluation

1. Write the following steps from the recycling paper activity on the board and have students put them in correct process order.
   - mix paper and water into pulp
   - let paper dry
   - press water out of pulp
   - separate contaminants such as metal or plastic from paper
   - pour pulp over mold screen
   - shred paper into small pieces
2. Have students write a paragraph about the physical changes required to recycle paper. If

different variables (starch, bleach, dye, thicker pulp, etc.) were introduced and compared with the control samples, have students write up results.

3. Have students describe as many uses as possible for recycled paper.

Read the directions through once before beginning.

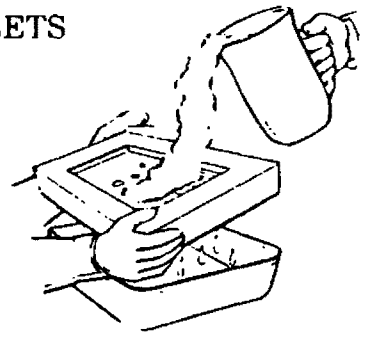
MAKING PAPER PULP

1. Take some scrap paper from the scrap paper box. Remove any plastic, staples or other materials which are not paper. Tear paper into small pieces. (They need not be tiny bits.)

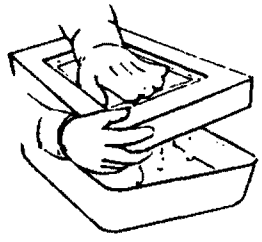
2. Fill the blender half full of warm water and put a handful of torn paper into it. IMPORTANT: Do not turn on blender with the lid off! Put lid on blender and blend paper until it turns to pulp. (This will happen quickly.)

PROCESSING PAPER INTO SHEETS

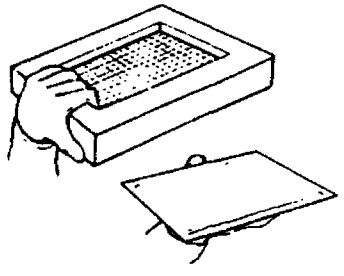
3. Hold the screen over the container while your partner pours pulp over the screen.



4. Hold a sheet of paper (or wooden block) over the pulp on the screen and press as much water out as you can.



5. Turn screen upside down on top of the sheet of paper (or wooden block) and lift screen away.



DRYING WET SHEETS

6. Take your paper (or wooden block) with wet sheets on top to the drying area.

7. Let your paper dry for about 24-48 hours. When dry, peel the newly formed sheet off the paper or wooden block.

WHAT'S UNDER WATER?

PRIMARY

Objectives

Students will be able to: (1) *explain* how waterways become littered; (2) *suggest solutions* to keep from polluting our beaches and waterways. Students will improve their abilities to *solve problems* and *write creatively*.

Method

Students *infer* whether objects will float or sink and observe them when placed in an aquarium tank in the classroom. They complete handouts to show where litter can be found and what should be done with it. They *observe* a demonstration to compare the degradability of waste on land with the degradability of waste in water.

Duration: four class periods

Setting: classroom

Subjects: Social Studies, Science, Language Arts

Curriculum Reference: 3.1, 3.4, 5.1

Preparation

Put 2" of gravel in an aquarium. Add water to fill to ¾ full. Collect the following: plastic 6-pack holder, empty aluminum pop can, empty tin can, empty plastic 2-liter pop bottle, metal bottle cap, empty glass pop bottle and metal can opener. For an additional demonstration you will need some organic garbage (paper, vegetable scraps, wood) and another set of each of the items listed above. Also, a container with soil will be needed.

Vocabulary

beach, float, lake, litter, ocean, recycle, river, sink

Handouts

Keep Our Water and Beaches Clean; Unhappy at the Bottom

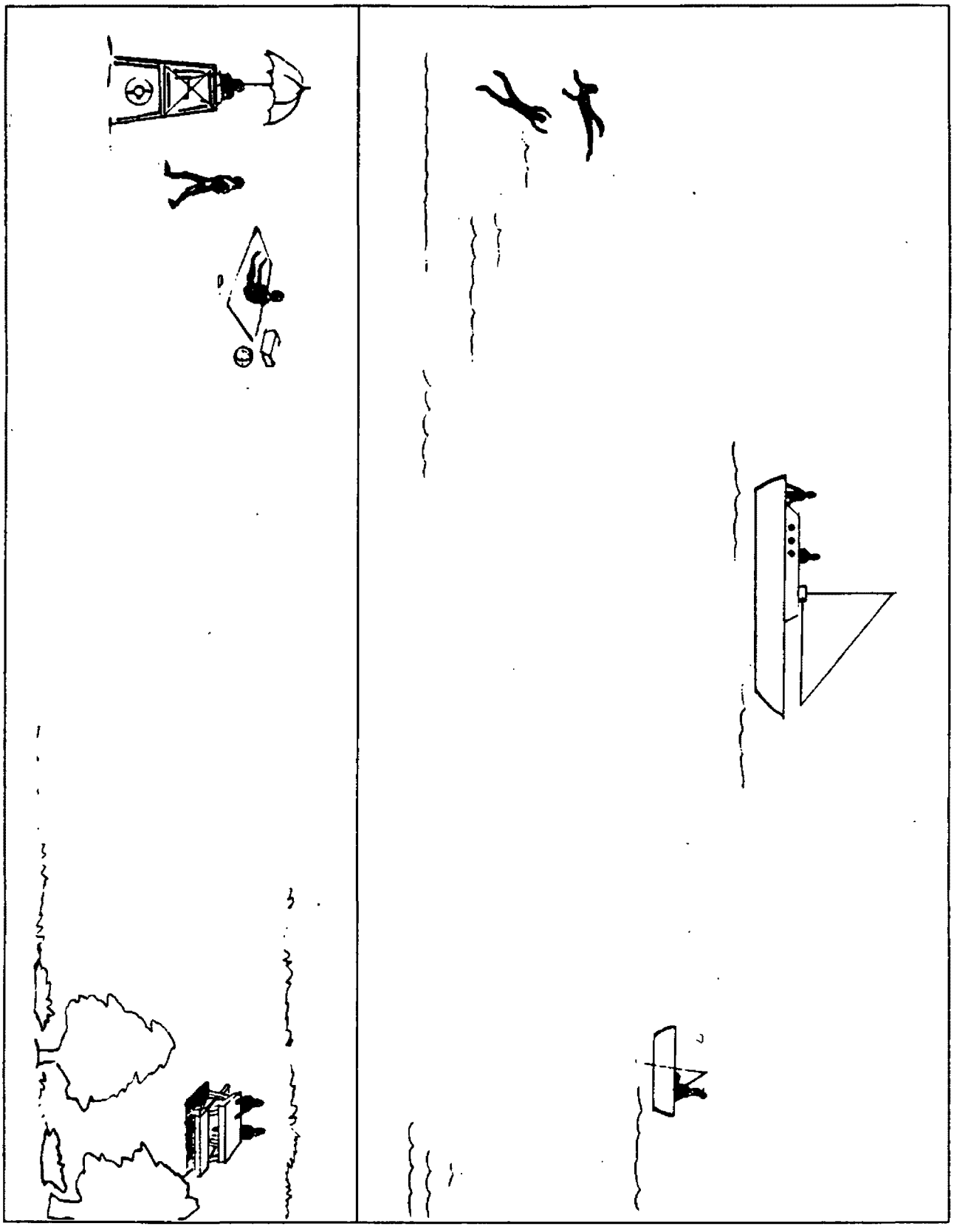
Procedures

1. Display the seven litter items next to the aquarium. Ask students which items will float and which items will sink when placed in the water. Record their responses. Student volunteers place each item in the water (one at a time) and observe what happens. Record results and compare with initial inferences the students made.
2. Point out that some empty containers may fill with water and sink. The time they take to sink may vary based on certain conditions, such as rough water or human manipulation.
3. Have students make a list of litter that may be under water in lakes and rivers. Discuss the consequences of this. (Fish can be killed if they get stuck in a six-pack ring holder, people can be hurt by broken glass in swimming areas.)
4. Distribute the handout, ***Keep Our Water and Beaches Clean***. Give students time to complete the handout. Then ask what is missing from this picture which could help prevent littering (waste containers on land, litter bags in the boat, less use of throw-away containers and eating utensils, a recycling collection bin).
5. Set up a demonstration to compare the degradability of solid waste in water with the degradability of solid waste in land environments. Add half of the organic garbage items to the aquarium which already has inorganic objects in it. Put an additional set of the inorganic items along with the rest of the organic garbage in a container (dishwashing pan, etc.) with soil. Let items rest on top of soil or push them into soil slightly. Have students compare rates of decomposition over a period of time.

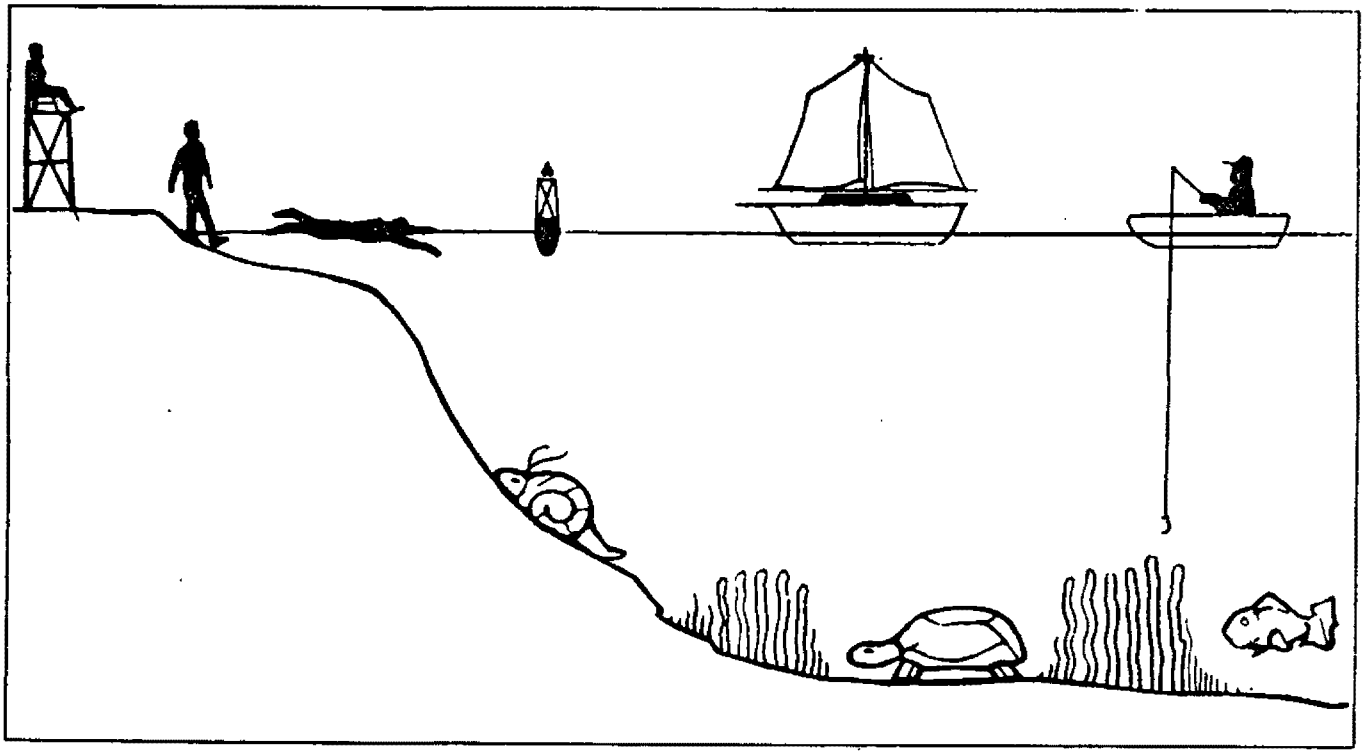
Evaluation Have students complete the handout, ***Unhappy at the Bottom***. Discuss answers in class. This could be done orally, or in writing.

KEEP OUR WATER AND BEACHES CLEAN

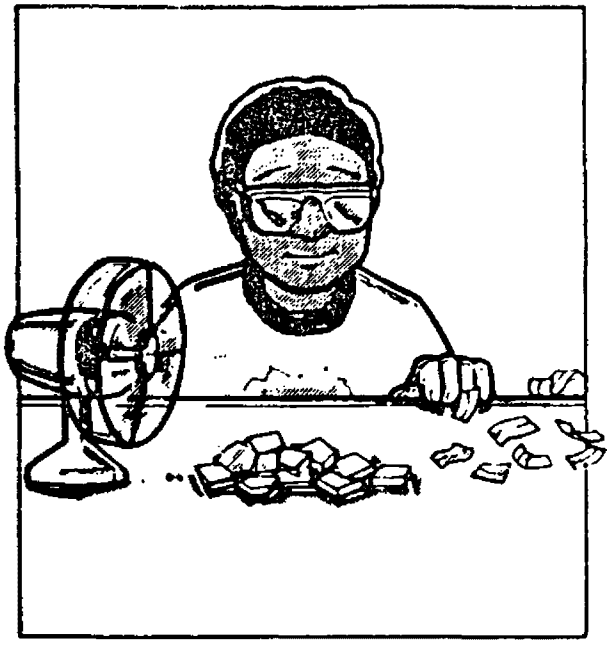
Directions: Look at the swimmers, the boaters and the picnickers. Draw pictures of items each might litter. Draw the littered objects close to the group responsible for them.



Directions: Draw some litter in the water. Write what the animals think about it in the spaces below the picture.



SEPARATION MANIA



INTERMEDIATE

Objectives

Students will be able to: (1) *describe* the function of various separation techniques in recycling processes; (2) *make deductions* from data to describe how physical properties of matter enable various separation techniques to be used. Students will improve their ability to *solve problems*.

Method

Students describe physical properties of ten waste items on a data sheet. They are presented with several mechanisms that can be used to separate these items and are then directed to make deductions from the information sheet to *design* a separation process in stages, using the mechanisms that had been introduced previously. Students work in pairs or small groups to compete for the most efficient design which is put to the *test* for classmates to observe and to be judged.

Duration: several class periods

Setting: classroom

Subjects: Science

Curriculum Reference: 1.1, 1.4, 1.6

Preparation

rulers, metric scales, a magnetic device (preferably a bar magnet which could be attached to a flat piece of wood), a small fan with two speeds or a hair dryer with two speeds, an aquarium tank or other large vessel for water, a size sorter (a cardboard box at least 1' by 1' with 2" square holes cut in the bottom), another cardboard box with flaps taken away but no holes in it; for each pair of students or for each small group, have the following items: aluminum can, tin can, several used or unused staples, pieces of paper or pieces of cardboard, piece of wood, styrofoam container, plastic two-liter bottle and the cup part from the bottle, an orange peel, some steel bottle caps. Have extra pieces of paper or cardboard on hand.

Vocabulary

properties of matter, recycling, sorting techniques

Handout

Properties of Waste Objects

Procedures

1. Discuss the concept of properties of matter, ie. size, shape, weight, susceptibility to magnetism. Discuss the importance of sorting materials according to type before they can be recycled. Show students the pieces of paper and staples. Explain how these often end up together at paper recycling plants and can be separated based on the physical property of magnetism in staples.

2. Explain how all of the items in this activity often end up at refuse facilities such as landfills and incinerators. Sometimes materials which are combustible and organic are separated from those which can be recycled or cannot burn.

3. Divide the class into pairs or small groups. Give each pair or group a set of items mentioned in the **Preparation**. Discuss some physical properties of the items.

4. Pass out a copy of the handout, ***Properties of Waste Objects***, to each pair or group of students and have them complete it. To do so, they will need to test the items in various ways in order to make choices on the handout. For this, have rulers, a tank of water, a magnet, a box with holes, and scissors at their disposal in various places throughout the room.

5. After the charts have been completed, discuss answers.

6. Display on a large table space the magnet, the small fan or hair dryer, the vessel of water, the size sorting device (box with holes), scissors and cardboard box.

7. Based on information completed on the handout assign the following task to each pair or group of students.

   GOAL: Use the equipment to construct a process for separating all ten items individually. Do this by designing separation techniques in a series of stages. You must begin with all ten items in one pile bunched up close together on the table. You can pick up items to place them where you want them to go each time you make a separation, but you cannot separate them with your hands while using a separation technique. The group that separates the items most efficiently, i.e. in the fewest stages or with the most success, wins.

   EXAMPLE: You could do the following demonstrations for students to give them ideas. Ask students, based on their information sheet, which items should float and which will not. Put all ten items, as your first stage in the process, in the water. Put those that floated on the table in a separate bunch from those which did not float. This represents the first stage or step to be counted in the process. The next step(s) must involve sorting items from each of the two piles. Eventually you want to separate each item individually. The individual separation of one item from the rest could happen in a first step depending on design. Do another demonstration. Use scissors to make a pile of shredded plastic (from the bottle) and of shredded paper. The shredding process represents only one stage although two types of material have been shredded. Set the fan on the table in front of the pieces of paper and plastic. Put the cardboard box at end of table. Turn the fan on at a distance from the pieces and at a speed which will blow only paper into the box (or perhaps only the plastic if the paper is wet from having been in the water). Now you have separated these two items in two steps including the shredding process. You have eight more items to separate. Explain that you have deduced this step based on information about the weight of the materials listed on the handout. One important technique would be one that separates the items into three instead of two piles. You may also want to judge designs based on energy efficiency by creating a scale of energy required to use the various pieces of equipment. The team using the least energy could be given a prize.

8. Now direct pairs or groups of students to look carefully at their information sheets, and design stages in a process to separate all of the materials. (You could allow them to test parts of their designs as they create them, but this will require more time and perhaps more waste materials to do so, as material like paper could be destroyed in testing.)

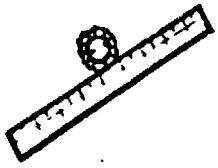
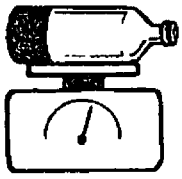
9. Have each pair or group of students present their process to the class and judge which is the most efficient and/or energy saving.

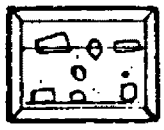
Evaluation

Have students explain what the following terms mean and why they are important for recycling processes.

Air Classification System
Magnetic Separation Device
Water Separation System
Size Sorting Device

PROPERTIES OF WASTE OBJECTS




NAME OF WASTE OBJECT	SIZE length × width	WEIGHT ounces	MAGNETIC	NONMAGNETIC	FLOATS	SINKS	SHREDS	DOES NOT SHRED EASILY

WASTE IN SPACE

INTERMEDIATE

Objectives

Students will be able to: (1) *infer* future needs to dispose of waste; (2) *explain* reasons why we need to find alternatives for waste disposal; (3) *describe* alternative ways to dispose of waste in space; (4) *deduce* that recycling is the best alternative to any means of disposal when recycling is possible. Students will improve *problem solving* skills.

Method

Students discuss problems associated with waste disposal. The problems associated with litter in space and disposing of waste in space are examined by reading a handout and answering questions to test comprehension. Students *draw* pictures of waste collection in space and *write* a story about their pictures. They discuss and take a poll about waste in space. Students explain why recycling is a good alternative to waste disposal.

Duration: five to six class periods

Setting: classroom

Subjects: Social Studies, Language Arts, Art

Curriculum Reference: 5.5, 8.1

Preparation

writing and drawing materials; a map of the solar system; reference books about the solar system (optional)

Vocabulary

disposal, incineration, landfill, orbit, recycle, solar system

Handouts

Trashing the Heavens; Space Waste Collection

Procedures

1. Discuss with students current problems associated with the disposal of waste. These should include the following:
   a. We are running out of landfill space to bury our trash and garbage.
   b. One alternative to burying waste is to incinerate it, but this can cause air pollution and there are still ash and residue to bury after waste has been burned.
   c. The history of the past fifty to one hundred years has shown that our waste production has increased; therefore, we have good reason to believe it will continue to increase in the future.
   d. Everywhere people go litter and waste seem to follow. Steps 2 and 3 below highlight waste problems in space: a current and future dilemma.
2. Initiate a discussion about our solar system. Show the class a map of the planets. Describe distances in space and special features of planets and stars. Describe various attempts that have been made to explore our solar system in manned spaceships and with satellites.
3. Mention that one effect of our space exploration has been a problem with waste in space. To help explain this, give each student the handout, ***Trashing the Heavens***, to read alone or as a class. Direct students to answer reading questions about the article and then discuss.
4. Divide students into groups to brainstorm problems associated with waste disposal and litter in space. After each group has listed some problems have them think of solutions that might still make waste disposal in space possible. Have each group make a short presentation to the class.
5. Give each student the handout, *Space Waste*

Collection, to complete. Note that this involves written assignment as well as making a design on the handout.

6. Mention to students that one suggested alternative to our waste disposal problems is to ship waste into space. List alternatives: e.g., send into sun to be incinerated; send into deep space beyond solar system. Initiate a classroom survey regarding these proposals. Put two columns on the blackboard with the headings "*FOR* Space Disposal" and "*AGAINST* Space Disposal." Have students put their initials in the column they choose and give a brief reason why they have made this choice.

Evaluation Have students answer the following question in writing: Why is recycling a better alternative to disposing of waste on earth or in space?

TRASHING THE HEAVENS

Directions: Read the news article and then answer the questions below on a separate sheet of paper.

NatureScope News — National Wildlife Federation (1986) Vol. 2 No. 2

There's a "down-to-Earth" phenomenon out there in space: litter. Old satellites, fragments of exploded rockets and other bits and pieces of junk are *in orbit* around Earth — and they're starting to create problems for functioning satellites, the space shuttle and other spacecraft.

In 1983, for example, the space shuttle Challenger had a "run in" with what researchers think was a tiny fragment of paint that had worn off of another spacecraft. Like all objects in space, the paint was traveling at a tremendous speed — so fast that it dented the shuttle's window when it smashed into it. Fortunately, the hurtling fragment didn't actually break the window. If it had, the crew of the Challenger would have been faced with a very dangerous situation.

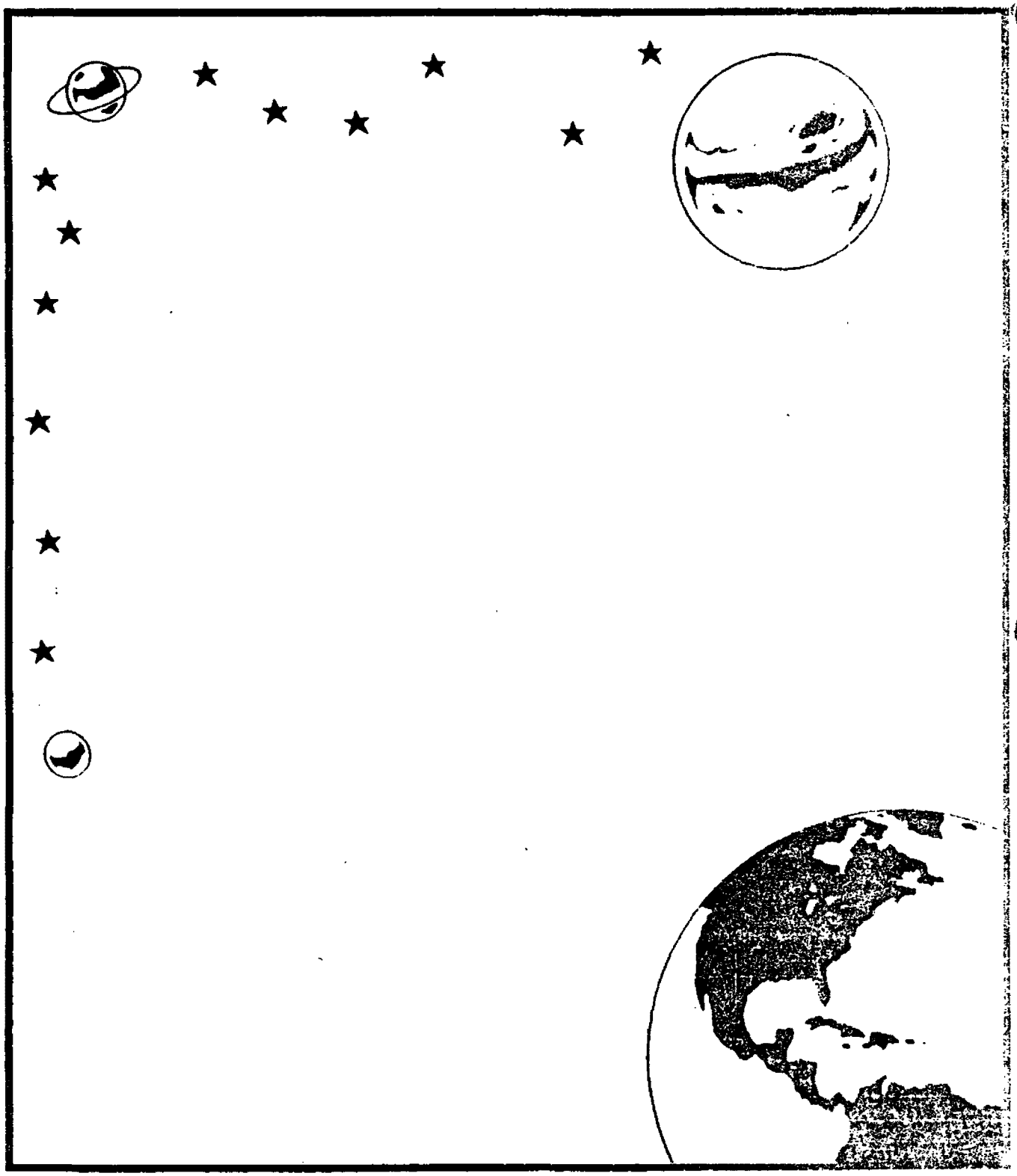
In an effort to find solutions to the problem of litter in space, scientists at NASA have been trying to learn more about it. They've been using special telescopes to locate the orbits of pieces of junk — some of which are as small as a pebble. And a lot of people have been tossing around ideas about how to get rid of the trash.

One way of alleviating the problem might be to launch a kind of giant space trash collector. Using robot arms controlled from Earth, the device would go around picking up pieces of space junk. Then it would either guide the pieces into Earth's atmosphere, where they'd burn up from friction, or take them into an out-of-the-way orbit, where they'd be less likely to collide with spacecraft.

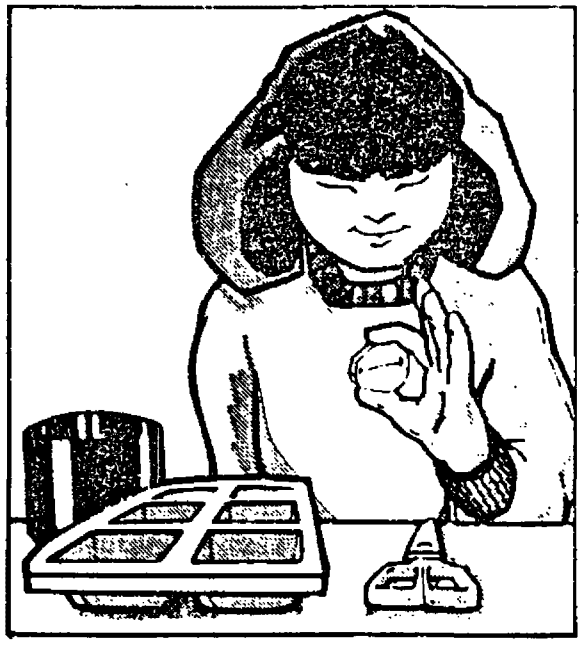
Other ideas for getting rid of space trash have also been proposed. Maybe one of them will solve the problem — before the sky above us turns into one big dangerous trash dump!

1. What does "*in orbit*" mean in the first paragraph? (Answer can be found in the second paragraph.)
2. Why is litter "*in orbit*" such a problem?
3. What is one way scientists have been using to learn more about the litter problem in space?

Directions: **Design a machine or vehicle that could collect space litter. Then on a separate piece of paper write a fictional story about a day in the life of a space garbage collector.**



RECYCLING PLASTIC



INTERMEDIATE

Objectives

Students will be able to: (1) *identify and describe* physical changes in matter which are required in recycling processes involving plastic, glass, aluminum and other metals; (2) *explain* why plastic is difficult to recycle. Students improve their ability to *observe changes.*

Method

Students participate in a demonstration to recycle plastic using the cup part of two-liter plastic pop bottles. They *manipulate tools* to cut plastic, to make an impression on a mold and to make decorative use of the ornamental piece of plastic made from the recycled plastic. They complete a handout using different words that represent different types of plastic.

Duration: two to three periods

Setting: classroom

Subjects: Science, Language Arts, Arts & Crafts

Curriculum Reference: 1.3, 1.5

Preparation

You will need the following:

- two-liter pop bottles with plastic bottoms
- scissors
- teflon-coated muffin pans
- non-stick kitchen spray
- conventional or toaster oven
- pot holder
- wash basin
- sealing wax stamp

For the language arts part of the activity you will need a plastic garbage bag and dictionaries. (It would help to have dictionaries that list words from organic chemistry such as vinyl, chlorine and polyethylene.)

Vocabulary

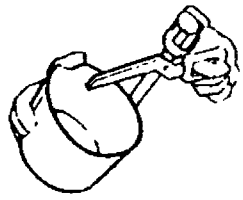
organic chemistry, petroleum, physical changes, plastic, prefix, recycling, suffix

Handout

Words in Organic Chemistry

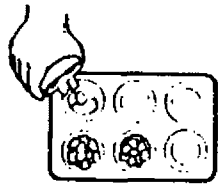
Procedures

1. Discuss changes in the physical state of matter with students. Pay particular attention to the changing of solids into liquids through the application of heat and then changing back to a solid by diminishing heat. Have students think of examples: candle wax is first solid until wick is lit. Then it becomes a liquid form at the top of the burning candle, yet as wax runs down the side it escapes the heat thus hardening into solid form again. Make note that before dripping wax hardens completely it can be shaped without breaking. Other examples of heating materials, forming them into shapes while hot and then allowing them to cool into a solid state again include aluminum recycling of aluminum cans, glass recycling of glass bottles and the recycling of ferrous metals from old automobiles into steel rods used in concrete construction.
2. Divide students into groups of six. Have each group obtain some empty two-liter plastic pop bottles, and have them remove the bottom cups from these.
3. Using scissors, have students cut up the plastic bottom cups into small pieces (about 1/2 inch square). Do not use plastic pieces that have glue on them. At least ten pieces for each student in the group should be cut.



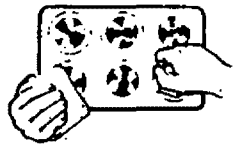
4. Preheat oven to 400°F. Spray the muffin pan with non-stick kitchen spray.

5. Students should place all of their pieces in one of the muffin pan cups. (About ten pieces of plastic are enough to cover the bottom of a cup, but add more if bottom is not covered.)

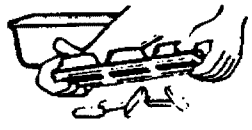


6. Place the pan in the oven. Check every few minutes. When plastic has melted, use pot holder to remove the pan from the oven.

7. One at a time, have each student from the group use the wax stamp to make an imprint on the plastic. BE CAREFUL NOT TO TOUCH THE PAN, IT IS VERY HOT!



8. Dip pan in wash basin full of cold water. Plastic pieces can be easily removed from the pan.



9. Repeat process with the other groups.

   REMEMBER. There are many different colors of plastic bottle bottom cups available. You may mix any colors you like. Be creative. The plastic pieces can be put on a necklace or used as ornaments. Different shaped pans can be found and used to create different shapes. (Be sure pan is teflon coated and used with non-stick spray.)

10. Ask students why only the bottom plastic cup part of the bottle was used in this activity. By observing the bottle they should be able to deduce that the cup part appears to be made from a different type of plastic than the bottle part. This means that the two types of plastic may have different physical and chemical properties. In terms of physical properties of matter, the translucent plastic bottle part melts at a much higher temperature than the bottom part. In terms of chemical properties of matter, the bottle part releases poisonous fumes if burned at high temperatures.

11. Note that one of the problems with plastic recycling is that there are many different types of plastic, requiring different recycling processes. So it is important to separate different types of plastic before recycling.

12. To help students understand the variety of plastics that can be made by combining chemical elements into other compounds and mixtures, give each student the handout, ***Words In Organic Chemistry***, to complete.

Evaluation

1. Have students list in writing the physical changes they made in the plastic cup to recycle it.

2. List these two words on the board with their definitions:

   ISOFORM RECYCLING - material is recycled to make the same or similar product

   HETEROFORM RECYCLING - material is recycled to make a different product

   Ask students: When the two-liter bottle cup was recycled in the activity, was that an example of isoform or heteroform recycling? Why? (heteroform recycling)

Plastic two-liter pop bottles are made of two types of plastic. The bottle part is made of POLYETHYLENE TEREPHTHALATE (or PET). Can you pronounce these two words? (See bottom of page.) The cup part is made of HIGH DENSITY POLYETHYLENE (or HDPE).

1. What prefix is found in the word POLYETHYLENE? _____
2. What does it mean? _____
3. Therefore, POLYETHYLENE is a plastic material which includes _____ units of ETHYLENE.
4. If a plastic material is called MONOETHYLENE, how many units of ETHYLENE does it have? _____

Plastic products are also made from materials with names resembling ETHYLENE, such as STYRENE and PROPYLENE.

5. What suffix do these three words share? _____

   (This suffix refers to the way these types of plastic are made which gives them strength.)

6. If plastic made from STYRENE included more than one unit of STYRENE, it would be called _____ .

Density relates to the compactness of matter.

7. What do the words *high density* mean? _____
8. What does *low density* mean? _____

Compare a plastic garbage bag to the cup part of a two-liter bottle.

9. Which one is made of *low density* Polyethylene? _____
10. All of the chemical words used above can be found in an organic chemical dictionary. Why are they found in an organic chemical dictionary and not an inorganic chemical dictionary? (HINT: Look up words *organic* and *inorganic* and look up the word *plastic* to find out what plastic is made from.) Write answer on back.

POLYETHYLENE (päl' ē eth' ə lēn') TEREPHTHALATE (ter' ef thal' āt)

REFERENCES

- "THE GROWING CLASSROOM"
- LIVING LIGHTLY IN THE CITY BY SCHLITZ AUDUBON CENTER
- OHIO DEPARTMENT OF NATURAL RESOURCES
- PROJECT WILD
- TENNESSEE VALLEY AUTHORITY, CITIZEN ACTION OFFICE
  400 WEST SUMMIT HILL DRIVE
  KNOXVILLE, TN 37902
- LESSON PLANS, EARTH DAY, 1990, STANFORD UNIVERSITY

E - OUTDOOR EXPLORATIONS

• STRING HIKE

EACH STUDENT HAS A STRING A FEW FEET LONG. TAKE THE STRINGS OUTSIDE AND DRAPE THEM ON THE GROUND (GRASSY OR NATURAL AREAS ARE BEST). EACH STUDENT CRAWLS SLOWLY ALONG STRING EXAMINING AREA ALONG IT - MAGNIFIERS HELP. NEXT, EACH STUDENT TAKES A "PARTNER" ON A GUIDED "NATURE HIKE" ALONG THE STRING "TRAIL". PARTNER THEN TAKES STUDENT ON A "HIKE" ALONG HIS STRING. GOOD FOR IMAGINATION: PRETEND YOU ARE SMALL INSECT AND IMAGINE WHAT THE AREA LOOKS LIKE TO YOU.

• WILDLIFE ALL 'ROUND

CONCEPTS: WILDLIFE EXISTS IN MANY FORMS, OFTEN SMALL. PEOPLE SHARE ENVIRONMENTS WITH WILDLIFE.

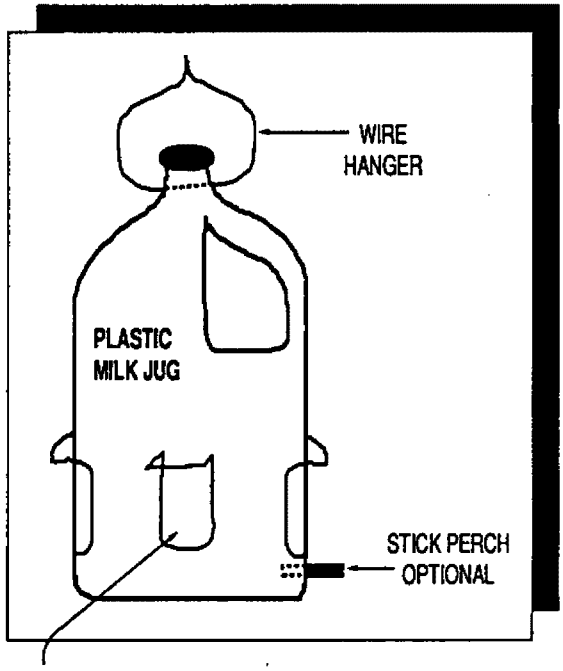
STUDENTS EXPLORE SCHOOLYARD FOR SIGNS OF WILDLIFE AND SIGNS (TRACKS, WEBS, DROPPINGS) OF WILDLIFE. DO NOT HARM OR DISTURB ANY CREATURE. LOOK UNDER ROCKS, CANS, ETC.

DISCUSS WHAT WAS FOUND. EXTEND THE SEARCH INSIDE THE SCHOOL BUILDING OR CLASSROOM (DEAD INSECTS BY LIGHTS? SPIDER WEBS? HOLES IN BASEBOARDS?)

• RECYCLING IS FOR THE BIRDS

COLLECT OR HAVE STUDENTS BRING IN A VARIETY OF (CLEANED) CONTAINERS: PLASTIC AND PAPER MILK JUGS, PRINGLE'S CANS, TENNIS BALL CANS, ETC. HAVE AVAILABLE: SCISSORS, PUNCHES, WIRE, STICKS. LET CHILDREN DESIGN AND CREATE BIRD FEEDERS FROM THE CONTAINERS. HANG THE FEEDERS OUTSIDE AND STOCK WITH SEED. WHAT BIRDS COME?

NOTE: IT MAY TAKE A WHILE FOR THE LOCAL BIRDS TO BECOME AWARE OF THE FEEDERS.



WINDOWS ARE CUT INTO THE PLASTIC. CUT ON 3 SIDES & FOLD THE TOP FLAP UP FOR A "ROOF."

• **DRAFT BOARD DESIGNS**

YOU ARE A LANDSCAPE ARCHITECT. YOUR JOB IS TO MAKE YOUR SCHOOL MORE ENERGY EFFICIENT BY PLANTING TREES AND BUSHES AROUND THE SCHOOL. THE CHILDREN ALSO WANT HABITATS PROVIDED FOR WILDLIFE. HOW WILL YOU ACHIEVE BOTH? MAKE A DRAWING DEMONSTRATING YOUR PLAN. REMEMBER THAT THERE WILL BE A LOT OF CHILDREN PLAYING ON THE GROUNDS.

• **POND STUDY**

PLACE A BUCKET OUTSIDE AND LET IT FILL WITH RAIN WATER (CAN BE FILLED BY HAND.) RECORD CHANGES THAT OCCUR AFTER THE FIRST WEEK, SECOND WEEK, ETC. TAKE SAMPLE AND STUDY UNDER A MICROSCOPE. IS ALGAE PRESENT, MOSQUITO LARVA, OTHER INSECTS? WHAT HAPPENS TO THE WATER IF THERE IS NO RAINFALL — IF THERE IS A LOT OF RAINFALL — DOES THIS HAPPEN IN NATURE? IF AVAILABLE, VISIT A POND OR STREAM AND STUDY CHANGES. IF A PESTICIDE WERE SPRAYED IN THE BUCKET WHAT DO YOU THINK WOULD HAPPEN? WOULD YOU WANT TO DRINK IT?

• **AIR POLLUTION COLLECTORS**

USING EITHER CONTACT PAPER (STICKY SIDE SHOWING) OR WAX PAPER WITH VASELINE, ATTACH TO A SQUARE OF CARDBOARD AND HANG IN DIFFERENT LOCATIONS (WOODS, PLAYGROUND, SCHOOL, HOME, NEAR A ROAD.) AFTER FOUR DAYS, CHECK THE COLLECTORS. WHICH ARE THE DIRTIEST, THE CLEANEST? LOOK AT THEN UNDER A MICROSCOPE.

F - ACTIVE GAMES

"MIGRATION HEADACHE"

AT EITHER END OF A LARGE PLAYING AREA (GYM OR SCHOOLYARD) PUT DOWN ENOUGH PAPER PLATES SO THAT EACH END HAS ONE PLATE FOR EVERY 3 CHILDREN. SCATTER 1 PLATE PER 3 CHILDREN BETWEEN THE 2 END ZONES. THE END ZONES REPRESENT WINTERING HABITAT AND NESTING HABITAT FOR MIGRATING BIRDS, THE SCATTERED PLATES ARE RESTING STOPS EN ROUTE, AND THE CHILDREN ARE MIGRATING BIRDS. "BIRDS" OCCUPY A HABITAT BY PUTTING ONE FOOT ON THE PLATE; ONLY 3 "BIRDS" MAY OCCUPY A HABITAT AT ONE TIME.

IF THE "BIRDS" ARE WATERBIRDS, THE HABITATS ARE WETLANDS, AND THE PERILS ENCOUNTERED INCLUDE OIL SPILLS, WATER POLLUTION, DRAINAGE, CONVERSION TO FARMLAND, STREAM CHANNELIZATION, DISEASE, ETC. IF THE "BIRDS" ARE SONGBIRDS, HABITATS ARE FORESTS AND GRASSLANDS, AND THE PERILS ENCOUNTERED INCLUDE CUTTING AND LOGGING, BURNING OF THE TROPICAL FOREST, CONVERSION TO FARMLAND O SUBDIVISIONS, ETC. FACTORS THAT HELP BIRDS SURVIVE INCLUDE HABITAT PRESERVATION AND RESTORATION, RAINFALL AND FAVORABLE WEATHER, ETC.

"BIRDS" ALL START AT THE WINTERING GROUNDS. AT THE TEACHER'S SIGNAL, THEY RUN AND OCCUPY RESTING HAVENS; AT THE NEXT SIGNAL THEY RUN AND OCCUPY NESTING GROUNDS.

THE TEACHER EXPLAINS THAT NATURAL AND MAN-MADE CHANGES IN HABITAT AFFECT BIRDS' SURVIVAL. TEACHER ANNOUNCES A CHANGE, THEN REMOVES AN APPROPRIATE NUMBER OF PLATES FROM REST HAVENS AND/OR WINTERING GROUNDS. AT A SIGNAL, "BIRDS" FLY FIRST TO REST STOPS THEN TO WINTERING GROUNDS. BIRDS UNABLE TO OCCUPY A HABITAT (PLATE) "DIE" AND GO TO THE SIDELINES. "DEAD BIRDS" CAN REJOIN THE GAME AS HATCHLINGS WHEN HABITAT CONDITIONS IMPROVE AND TEACHER PUTS MORE PLATES OUT.

AT EACH ROUND, TEACHER ANNOUNCES SOME CHANGE TO HABITAT AND REMOVES OR REPLACES PLATES. REMEMBER THAT, WORLDWIDE, HABITAT IS DISAPPEARING.

CONTINUE FOR ABOUT 8 ROUNDS. FOLLOW WITH A DISCUSSION OF FACTORS AFFECTING THE SURVIVAL OF MIGRATING BIRDS.

ADAPTED FROM PROJECT WILD

ACTIVE GAMES

"OH DEER"

DIVIDE CHILDREN INTO 2 LINES AT OPPOSITE ENDS OF A LARGE PLAYING AREA. 3/4 OF THE CHILDREN GO TO ONE END AND BECOME HABITAT COMPONENTS. 1/4 GO TO THE OPPOSITE END AND BECOME DEER (OR SQUIRRELS, OR RABBITS, ETC.). DEER NEED TO FIND FOOD, WATER, AND SHELTER IN THEIR HABITAT. EACH DEER SIGNALS WHICH ONE COMPONENT IT NEEDS AS FOLLOWS: FOOD - RUB STOMACH; WATER - PUT CUPPED HAND TO MOUTH; SHELTER - HOLD HANDS TOGETHER OVER HEAD. CHILDREN IN HABITAT CAN CHOOSE WHICH ONE COMPONENT THEY WANT TO BE, USING THE SAME SIGNALS.

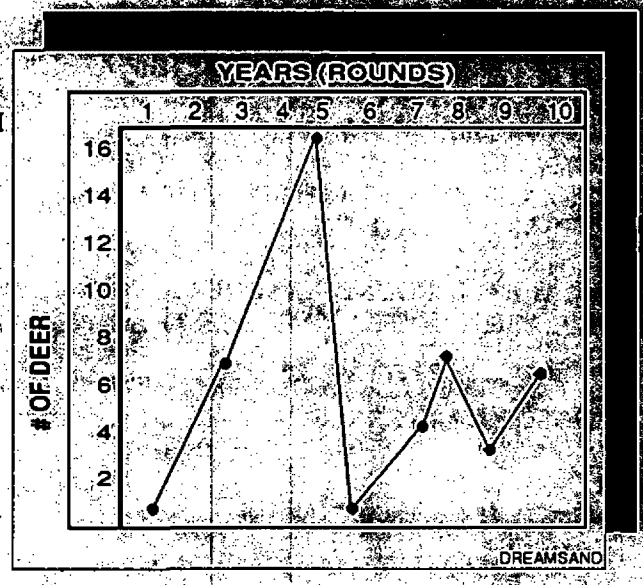
AT START OF EACH ROUND, HABITAT AND DEER STAND WITH THEIR BACKS TO EACH OTHER, CHOOSE AND MAKE THEIR SIGNALS. KEEPING THE SIGNAL IN PLACE, THEY FACE EACH OTHER. AT THE TEACHER'S SIGNAL, DEER RUN TO A HABITAT COMPONENT WITH THE SAME SIGNAL (ONLY ONE DEER MAY CLAIM EACH COMPONENT; STUDENTS MAY NOT CHANGE SIGNALS DURING A ROUND).

SUCCESSFUL DEER TAKE THEIR CLAIMED HABITAT COMPONENT BACK TO THE DEER LINE TO BECOME DEER IN THE NEXT ROUND. UNCLAIMED HABITAT STAYS IN PLACE FOR THE NEXT ROUND. DEER THAT COULD NOT FIND A MATCHING HABITAT COMPONENT "DIE" AND BECOME PART OF THE HABITAT.

DEER AND HABITAT COMPONENTS MAY CHOOSE A NEW SIGNAL AT THE START OF EACH ROUND.

THE TEACHER KEEPS A CHART OR GRAPH OF THE CHANGES IN DEER POPULATION EACH "YEAR" (ROUND) OF THE STUDY. THE TEACHER MAY MANIPULATE THE GAME WITH INSTRUCTIONS TO THE HABITAT (A YEAR OF DROUGHT-NO WATER; ETC).

FOLLOW WITH DISCUSSIONS OF WHAT ANIMALS NEED TO SURVIVE, CHANGE IN NATURE, "BALANCE OF NATURE" AS A DYNAMIC PROCESS.



ADAPTED FROM PROJECT WILD

ACTIVE GAMES

DEADLY LINKS

FOR EACH STUDENT, HAVE ABOUT 20 SMALL PIECES OF WHITE PAPER OR YARN AND ABOUT 10 COLORED PIECES. PLACE ALL IN A BAG.

DIVIDE THE STUDENTS INTO HAWKS, SHREWS (3 PER HAWK) AND GRASSHOPPERS (9 PER HAWK). COLORED ARM BANDS MAKE IDENTIFICATION EASIER. SCATTER THE PAPER OR YARN PIECES OVER THE PLAYING AREA FLOOR. GIVE EACH GRASSHOPPER A PAPER BAG; GIVE GRASSHOPPERS 30- 45 SECONDS TO COLLECT AS MUCH "FOOD" (PAPER/YARN) AS POSSIBLE. STOP COLLECTING AT END OF TIME.

ALLOW SHREWS INTO THE AREA; GIVE THEM 30-45 SECONDS TO CATCH AS MANY GRASSHOPPERS AS POSSIBLE. ANY GRASSHOPPER TAGGED BY A SHREW MUST GIVE THE SHREW IT'S BAG OF FOOD AND THEN GO TO THE SIDELINES. UNCAUGHT GRASSHOPPERS MAY CONTINUE FOOD-CLOTHING. STOP PLAY AT THE END OF TIME.

ALLOW HAWKS IN TO CATCH SHREWS FOR 30-45 SECONDS. CAUGHT SHREWS GIVE FOOD BAGS TO HAWKS AND GO TO SIDELINES. UNCAUGHT GRASSHOPPERS AND SHREWS CONTINUE PLAY. STOP PLAY AT TIME END.

HAVE HAWKS AND UNCAUGHT SHREWS AND GRASSHOPPERS EMPTY THEIR FOOD BAGS AND COUNT THE NUMBER OF WHITE AND COLORED PIECES INSIDE.

TEACHER GIVES SHORT EXPLANATION OF PESTICIDES IN THE ENVIRONMENT. COLORED PIECES REPRESENT PRESENCE OF PESTICIDE IN FOOD SUPPLY. ANY GRASSHOPPER WITH ANY COLORED PIECES IS DEAD. ANY SHREW WITH HALF OR MORE OF THEIR FOOD PIECES COLORED IS DEAD. THE HAWK WITH THE GREATEST NUMBER OF COLORED PIECES IS NOT DEAD, BUT HAS SO MUCH ACCUMULATED PESTICIDE THAT ITS EGGS WILL NOT HATCH.

FOLLOW WITH DISCUSSION OF WHY PESTICIDES ARE USED, THEIR EFFECTS ON THE ENVIRONMENT, AND POSSIBLE ALTERNATIVES.

ADAPTED FROM PROJECT WILD

ACTIVE GAMES

MOTHER EARTH, MAY I?

BASED ON THE "MOTHER, MAY I?" GAME. 3 CHILDREN REPRESENT MOTHER EARTH: ONE IS SOIL OR LAND, ONE IS WATER, AND ONE IS FORESTS (OR PLANTS). MOTHER EARTH STUDENTS TAKE TURNS GIVING DIRECTIONS TO REST OF CLASS, AND STAND WITH BACKS TO CLASS. CLASSMATES LINE UP ABOUT 10 YARDS AWAY.

FIRST DIRECTION IS ON NUMBER AND TYPES OF STEPS CLASSMATES SHOULD TAKE (AS: 3 FROG HOPS, 2 GIANT STEPS, 4 BABY STEPS, GLIDES, CRAWL, FLAPPING JUMPS, ETC.). CLASSMATES TAKE TURNS ASKING "MOTHER EARTH, MAY I?" IF CHILD MOVES WITHOUT ASKING, MUST RETURN TO STARTING LINE. MOTHER EARTH MAY RESPOND "YES, YOU MAY" OR "ONLY IF YOU CAN TELL ME MORE ABOUT...THE LAND/FOREST/WATER", AND THEN ISSUE A CHALLENGE. TEACHER COULD PREPARE A LIST OF CHALLENGE QUESTIONS FOR EACH MOTHER EARTH STUDENT, OR REQUIRE THEM TO MAKE THEM UP THEMSELVES. (EXAMPLE CHALLENGES:)

WATER: NAME ONE WAY YOU USE ME/NAME ONE WAY TO SAVE WATER.

LAND: NAME SOMETHING THAT GROWS IN ME/ANIMAL THAT LIVES IN ME

FORESTS: NAME SOMETHING IN THE SCHOOL THAT CAME FROM ME.

WHEN A CHILD ADVANCES TO THE POINT WHERE THEY CAN TAG A MEMBER OF THE MOTHER EARTH TRIO, SHE/HE TAKES ON THAT ROLE. WHEN ALL 3 HAVE BEEN REPLACED, BEGIN OVER WITH THE NEW MOTHER EARTH.

ORGANIZATIONS

1. **NATIONAL ARBOR DAY FOUNDATION**
   100 ARBOR AVENUE
   NEBRASKA CITY, NEBRASKA 68410

2. **NATIONAL WILDLIFE FEDERATION**
   BACKYARD WILDLIFE HABITAT PROGRAM
   1412 16TH STREET, NW

3. **NATIONAL WILDLIFE FEDERATION**
   8925 LEESBURG PIKE
   VIENNA, VIRGINIA 22184-0001

   "YOU CAN DO IT" 77003
   "ENDANGERED SPECIES" EMG07
   "RECYCLE FOR THE BIRDS" 77005

4. **THE AUDUBON SOCIETY OF OHIO**
   2966 TIMBERCREST DRIVE
   CINCINNATI, OHIO 45238

5. **SIERRA CLUB**
   530 BUSH STREET
   SAN FRANCISCO, CALIFORNIA 94108

6. **AD-ALERT**
   WORLD WILDLIFE FUND
   DEPT. 2AI
   1250 TWENTY-FOURTH STREET, N.W.
   WASHINGTON, D.C. 20037
   INFO ON ELEPHANTS - HELP TO STOP POACHING.

7. **ENVIRONMENTAL DEFENSE FUND**
   257 PARK AVENUE, SOUTH
   NEW YORK, N.Y. 10010

7. **WORLD WILDLIFE FUND**
   1601 CONNECTICUT AVE., NW
   WASHINGTON, DC 20009

9. **NATIONAL AUDUBON SOCIETY**
   950 THIRD AVENUE
   NEW YORK, NEW YORK 10022

10. **THE NATURE CONSERVATORY**
    1800 N. KENT STREET
    ARLINGTON, VIRGINIA 22209

11. **U.S. ENVIRONMENTAL PROTECTION AGENCY**
    26 W. MARTIN L. KING DRIVE
    CINCINNATI, OHIO 45268

12. **CIVIC GARDEN CENTER**
    2715 READING ROAD
    CINCINNATI, OHIO 45206

13. **SUNROCK FARM**
    103 GIBSON LANE
    WILDER, KENTUCKY 41076

14. **AMERICAN FORESTRY ASSOCIATION**
    GLOBAL RELEAF
    P.O. BOX 2000
    WASHINGTON, D.C. 20013
    TREE PLANTING PROGRAMS.

15. **RAINFOREST ACTION NETWORK**
    301 BROADWAY, SUITE A
    SAN FRANCISCO, CA 94133

BOOKLIST

THE FOLLOWING BOOKLIST CREATED BY THE CHILDREN'S DEPARTMENT IS COMPRISED OF TITLES OWNED BY THE PUBLIC LIBRARY OF CINCINNATI AND HAMILTON COUNTY. TITLES MAY BE OBTAINED FROM THE MAIN LIBRARY'S CHILDREN DEPARTMENT AND FROM VARIOUS BRANCHES ACROSS THE COUNTY.

ENVIRONMENTAL ISSUES IN CHILDREN'S BOOKS

11/89

from
The Public Library of Cincinnnati & Hamilton County
CHILDREN'S DEPARTMENT

Picture Books (E)

Abisch	Around the house that Jack built
Armstrong	My animals
Baker	Where the forest meets the sea
Brandenberg	What can you make of it?
Brennan	Olaf's incredible machine
Carrick	Beach bird
Carroll	Dolphin and the mermaid
Catley	Jack's basket
Chen	Run, zebra, run
Cole	Magic school bus at the waterworks
Cowcher	Rain forest
De Paola	Michael bird-boy
Fife	Little park
Foreman	Dinosaurs and all that rubbish
Gantschev	Two islands
Geisel	Lorax
George	All upon a stone
Haley	Noah's ark
Hoban	Arthur's new power
Hoff	Amy's dinosaur
Hoff	Litter knight
Hurd	Wilson's world
Keith	Rrra-ah
Milgrom	ABC of ecology
Olsen	Smoke
Parnall	Mountain
Ricciuti	Donald and the fish that walked
Shortall	Just-in-time Joey
Shulevitz	Rain rain rivers
Silverstein	Giving tree
Spirin	Once there was a tree
Stone	Last free bird
Tabrah	Old man and the astronauts
Tresselt	Beaver pond
Tresselt	Dead tree
Udry	Tree is nice
Wildsmith	Professor Noah's spaceship

Juvenile Fiction (jFic)

Armstrong	MacLeod place
Bartos-Hoppner	Hunters of Siberia
Bell	Jenny's corner
Bodecker	Mushroom Center disaster
Burchardt	What are we going to do, Michael?
Byars	Blossoms meet the vulture lady
Byars	Midnight fox
Butterworth	Dave White and the electric wonder car
Conly	Rasco and the rats of Nimh
Dixon	Lion on the mountain
Ellis	Wild horse killers

Juvenile Fiction (continued)

George	Hook a fish, catch a mountain
George	Talking earth
George	My side of the mountain
George	Who really killed Cock Robin?
Harris	Wayfarer's tree
Hendrich	Girl who slipped through time
Herzig	Shadows on the pond
Hicks	Alvin Fernald, superweasel
Hyde	Island of the loons
Jackson	Endless pavement
Jewett	White heron
Laycock	King gator
Leek	Tree that conquered the world
McMahan	Lake Fear
Molarsky	Song of the empty bottles
Molarsky	Song of the smoggy stars
Morey	Canyon winter
Norton	Outside
St. John	What I did last summer
Shyer	Blood in the snow
Steele	Mike's toads
Whelan	Clearing in the forest
Wrightson	Moon-dark

Juvenile Nonfiction

j213	Fisher	I stood upon a mountain
j245	Francesco d'Assisi	Song of the sun
j301	Schwartz	Old cities and new towns
j301.3	Leaf	Who cares? I do
j301.31	Environmental Action Coalition	It's your environment
j301.31	Graham	Careless animal
j301.31	Gregor	Man's mark on the land: the changing environment
j301.31	[Hartmann]	Nature in the balance
j301.31	Marzani	Wounded earth; an environmental survey
j301.31	Pettit	Long, long pollution crisis
j301.35	Ross	What ever happened to the Baxter place?
j304.2	Lambert	Planet Earth 2000
j304.2	Lambert	Pollution and conservation
j328.73	Stevens	How a law is made: the story of a bill against air pollution
j333	Harrison	Conservation
j333	Joffe	Conservation
j333	Laycock	Alaska, the embattled frontier
j333	Laycock	Wild refuge
j333	Millard	Clean air -- clean water for tomorrow's world
j333	Munzer	Pockets of hope
j333.7	Anderson	Exploring city trees and the need for urban forests
j333.7	Branley	Feast or famine? The energy future
j333.7	Gardner	Save that energy
j333.7	Halacy	Energy trap
j333.7	Miles	Save the earth! An ecology handbook for kids
j333.7	Millard	Careers in environmental protection
j333.7	Shuttlesworth	Disappearing energy; can we end the crisis?
j333.7	Watson	Alternate energy sources
j333.7	Watson	Conservation of energy

Juvenile Nonfiction (continued)

j333.7	Weinstock	Wilderness war
j333.72	Gates	Conservation
j333.73	Pringle	What shall we do with the land?
j333.79	Lambert	Future sources of energy
j333.91	Pringle	Water: the next great resource battle
j333.95	Vandivert	To the rescue: seven heroes of conservation
j363	Gay	Acid rain
j363	Kiefer	Poisoned land: the problem of hazardous waste
j363	Nagel	Tree boy
j363	Pringle	Lives at stake: the science and politics of environmental health
j363.6	Beame	What happens to garbage?
j363.6	Steinberg	Who keeps America clean?
j363.6	Elliott	Our dirty land
j363.7	McCormick	Acid rain
j363.7	Woods	Pollution
j363.7	Zipko	Toxic threat
j363.728	Wilcox	Trash!
j363.73	Breiter	Pollution
j363.73	Bright	Pollution and wildlife
j363.73	Cochrane	Air ecology
j500	Allison	Wild inside
j550	Lampton	Planet earth
j551.21	Lauber	Volcano: the eruption and healing of Mount St. Helens
j551.3	Cochrane	Land ecology
j551.5	Hicks	World above
j551.5	Berger	New air book
j551.51	Lloyd	Air
j551.6	Bova	Man changes the weather
j574	Pettit	Guide to nature projects
j574.5	Adler	Environment
j574.5	Cook	Environment
j574.5	Couffer	Salt marsh summer
j574.5	Hungerford	Ecology: the circle of life
j574.5	Hylander	Wildlife communities from the tundra to the tropics...
j574.5	Milne	Phoenix forest
j574.5	Pringle	Ecology; science of survival
j574.5	Reid	Nature's network
j574.5	Ross	Cracks and crannies: what lives there
j574.5	Russell	Earth, the great recycler
j574.5	Schwartz	Food chains and eco-systems; ecology for young experimenters
j574.5	Stone	Populations: experiments in ecology
j574.5	Venn	Day and a night in the Arctic
j574.52	Berger	Mountain worlds
j574.52	Cowing	Our wild wetlands
j574.52	Horton	Closer look at grasslands
j574.52	Jaspersohn	How the forest grew
j574.52	Laycock	Exploring the great swamp
j574.52	Lerner	On the forest edge
j574.52	Pope	Closer look at jungles
j574.52	Pringle	Natural fire: its ecology in forests
j574.52	Welch	Close look in a spring woods
j574.52	Samson	Pond: the life of the aquatic plants, insects, fish...
j574.526	Catchpole	Grasslands
j574.526	Catchpole	Mountains

Juvenile Nonfiction (continued)

j574.526	George	One day in the Alpine tundra
j574.526	Hiscock	Tundra, the Arctic land
j574.526	Leutscher	Earth
j574.526	Williams	Between cattails
j574.5263	Bellamy	River
j574.5263	Cochrane	Water ecology
j574.5263	Parker	Pond & river
j574.5263	Schwartz	Hidden life of the pond
j574.5263	Stone	Marshes and swamps
j574.5263	Stone	Pond life
j574.5264	Althea	Rain forest homes
j574.5264	Bellamy	Forest
j574.5264	Forsyth	Journey through a tropical jungle
j574.5264	Schwartz	Hidden life of the forest
j574.5264	Schwartz	Hidden life of the meadow
j581.5	Cochrane	Plant ecology
j581.5	Hurd	This is the forest
j581.5	Lerner	Seasons of the tallgrass prairie
j581.5	Newton	Forest is reborn
j582	Buff	Big tree
j583.3	Parnall	Apple tree
j583.4	Bash	Desert giant
j585.2	Silverberg	Vanishing giants
j590	Rounds	Rain in the woods
j591	Silverberg	Auk, the dodo, and the oryx
j591.5	Pringle	Animals and their niches: how species share resources
j591.52	George	One day in the desert
j591.52	Vyn	Prairie community
j591.5264	Lavies	Tree trunk traffic
j595.1	McLaughlin	Earthworms, dirt, and rotten leaves
j598.13	Riedman	Turtles
j598.4	Roever	Brown pelican
j599.3	Fisher	Valley of the smallest
j599.5	Barbour	In the wake of the whale
j599.7	Ford	Island ponies: an environmental study of their life...
j599.7	Pringle	Follow a fisher
j599.7	Roever	Black-footed ferret
j604	Hahn	Recycling
j616.98	Anderson	Environmental diseases
j621	Millard	How will we meet the energy crisis?
j621.042	--	Energy, forces, and resources
j621.4	Smith	Energy and environment
j628.1	Berger	New water book
j628.1	Gutnik	Ecology and pollution/water
j628.1	Sootin	Easy experiments with water pollution
j628.4	Chapin	Clean streets, clean water, clean air
j628.44	Gutnik	Ecology and pollution/land
j628.44	Hawkes	Toxic wastes and recycling
j628.5	Aylesworth	This vital air, this vital water
j628.5	Berger	Pollution lab
j628.5	Elliott	Our dirty air
j628.5	Marshall	Air we live in
j628.5	Navarra	World you inherit; a story of pollution
j628.5	Podendorf	Every day is earth day

Juvenile Nonfiction (continued)

j628.5	Shuttlesworth	Clean air, sparkling water; the fight against pollution
j628.5	Tannenbaum	Clean air
j628.5	Ward	Environment & health
j628.5	Warner	Your world -- your survival
j628.53	Laycock	Air pollution
j628.53	Gutnik	Ecology and pollution/air
j631	Helfman	Our fragile earth
j631	Van Dersal	Land renewed
j634.1	Schnieper	Apple tree through the year
j634.9	Budbill	Christmas tree farm
j796.5	Allison	Sierra Club summer book
j818.309	Burleigh	Man named Thoreau
j818.309	Roach	Down to earth at Walden
j917.8	Young	Great American desert
j920	Coates	Great American naturalists
j920	Hirsch	Guardians of tomorrow
jB:M953	Dines	John Muir
jB:M953	Douglas	Muir of the mountains
jB:M953	Graves	John Muir
jB:M953n	Norman	John Muir, father of our national parks
jB:M953	Silverberg	John Muir, prophet among the glaciers
j970.5	Ashabranner	Morning star, black sun
j973.9	Quackenbush	Don't you dare shoot that bear!
j975.9	Blassingame	Everglades

See Children's Magazine Index

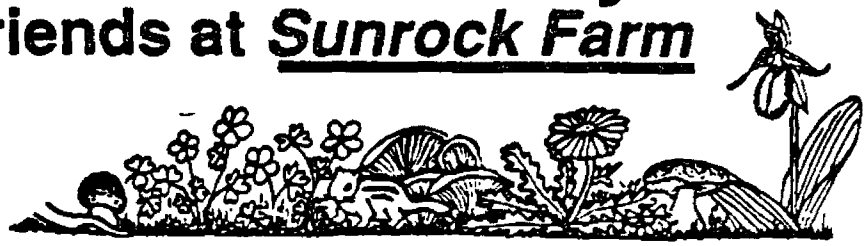
and

See these subject headings (in Card Catalog and Supplemental Index drawers):

ecology
energy
environment
endangered animals
conservation
garbage
hazardous waste
lumber and lumbering
nature
pollution -- air and water
recycling
rain forests
Sierra Club
strip mining
toxic waste
trash
forestry
trees
acid rain

Teaching ideas for Earth Day 1990

--from your friends at Sunrock Farm



April 22, 1990

A Holiday for Planet Earth

We all have birthdays. We have Mother's Day and Father's Day. And don't forget Christmas and Halloween. This year we have a day to remember and honor Planet Earth and everything in it. It is an important day because Earth is important, and sometimes we forget this. Earth is both our home and our family.

What is the Planet Earth?

More and more young children recognize that they live on a blue-and white ball hanging freely in the blackness of space close to the sun and the moon, surrounded by tiny stars. It is an-cient place--four billion years old-- full of wonder and delight. The atoms of Earth were made in suns which exploded long ago. Slowly gravity pulled the matter of Earth together and it keeps us close to Earth even when we forget it's there.

Three and a half billion years ago life appeared in Earth, and 50,000 years ago our type of human, *homo sapiens*, appeared. We invented farming 10,000 years ago and now have a human population of over five billion which is doubling every thirty five years. Humans are now changing the air, forests, soils, oceans, animals and plants of Earth at a very fast rate. We are changing something which took a very long time to get here the way it is. Now we know what we are doing to Earth and are learning to help the planet instead of hurting it.

We know that Earth is our home and it is a family of living and non-living things. It can even be called alive because it regu-lates itself the way living things do.

Humans are part of the family of Earth. More and more we are learning to share the planet with the other members of our Earth family--with the ani-mals, plants, water, soil, air, and other elements. Like children growing up we are learning to replace selfishness and greed with Earth awareness and con-cern for animals, forests, water, air, plants and soil.

Project ideas for Earth Day 1990

We best learn by doing. Here is a start in thinking about what your class can do for Earth Day.

* Collect and recycle aluminum cans. Discuss how nature re-cycles everything.
* Plant a tree. Planting time is during March.
* Take the class on an outdoor field trip.
* Adopt a zoo animal. Make it a real learning experience.Discuss how many animals are now in danger of becoming extinct because of human activity.
*Select a few local animals, trees, plants, etc. Learn about them and vote on one as the class animal, tree, plant, etc.
*Have an Earth Party where your pupils dress up (or have masks) as different members of the Earth family: as plants, animals, rocks, rivers, trees, etc. and everyone tells the class who they are and what they do in Earth. For example, "I am a black bear. I sleep during the winter. I eat honey, fish, small animals, berries, fruit, even insects. I roar like this. I walk like this."

Ideas for Earth Day 1990:

What is your natural address?

Your pupils write down or discuss how to get to their house using only natural markers (creeks, trees, fields, etc.), how to get to school, the grocery, and so on. For example, the school is 500 ft. north of the (name) creek, 200 ft. southwest of a large field. (Note that a clear understanding of the natural directions: north, south, east and west is important to this exercise.)

Where does our water come from?

The pupils write about and/or discuss where the water that comes into their houses and out of the house faucets comes from. In Cincinnati most of the water comes from the Ohio River. How does it get there? Where does our water go when we are finished washing our hands or doing the dishes? What are the people who live up-stream doing with the river water? What does it mean to say, "We all live downstream!"

Are people solar powered too?

Discussion is focused on how the ultimate source of energy for all living things on Earth is the sun. Plants through photosynthesis convert sun energy into starch to feed themselves and provide food for animals and people. The sun gives light and heat to Earth. All living nature depends on the sun for the energy to stay alive. Human-caused air pollution declines when people get more of their light and heat directly from the sun. (Fossil fuel is stored sunlight, but causes pollution when burned and will eventually all be used up.)

Yes, people are also sun powered. We eat sunlight, but it has to go through the plants and animals first. It has to join together with materials from Earth before we can use it to keep us alive. For us to stay alive we need food from the sun joined together with food from Earth. The Indians say that we need both Father Sun and Mother Earth together.

Do you have a second body?

Challenge your students with a different view of Earth. In this exercise we go from what we know to what we don't easily see. The parts of our body are alive, for example, our nose is alive because it is attached to the rest of the body. Cut off the nose and it will die. The whole body is alive because it is attached to Earth which every day gives it air, food, and water. Take the body outside of Earth, put the body in outer space and it will die for lack of air, food and water. (Space ships must return to Earth for these things.)

Some people say we really have two bodies. The first body has a head, legs and arms. But it is attached to a "second body", Earth, which keeps the first body alive. And gravity keeps us all together.

The living planet we call Earth is a very different thing from us. This difference needs to be respected, but some simple comparisons with what we know may help us to appreciate Earth.

* The human body protects itself with the skin. Earth uses the atmosphere as a membrane filtering out harmful radiation from the sun and keeping heat in.(The ozone layer is part of this system.)
* Humans have a blood system to distribute food and remove waste. Earth uses the combined (gas-liquid) system of the atmosphere and the oceans, lakes, and rivers to move oxygen around.
* Humans have a heart to pump the blood. Earth's daily rotation on its axis creates night and day, cold and hot to move currents in the atmosphere and oceans. Every day is a heartbeat for Earth.
* The living parts of Earth (the biosphere) maintain conditions of temperature, radiation, levels of oxygen, nitrogen, and carbon dioxide through feedback mechanisms much like the human body controls it's temperature, oxygen and carbon dioxide levels.
* Earth's atmosphere has remained at 21% oxygen for millions of years, and this is the mix we need for living things.
* The oceans have been 3.5% salt for millions of years in spite of the fact that rivers dump hundreds of tons of salt into the oceans every day. Earth processes remove the salt before it reaches dangerous levels.

WIN AN EARTHBALL:
Tell Sunrock Farm what your class is doing for Earth Day, and register for a drawing on April 22 for five winnners of a 16" Earthball. Call 781-5502 to register.

We are the Tree People

Throughout human history people have adapted to their natural surroundings and learned to live in harmony with them and to love the natural things of their home region.

People living in the desert have been called "the desert people." People living in the swamplands have been called "the swamp people." We also hear about the mountain people, the jungle people, the plains people. We who live in the Ohio River Region are surrounded by the trees of the Eastern Woodlands. We can be called "the tree people." This means we have a special connection with trees.

Have your pupils write about trees and/or discuss trees in class.

Expressing Kinship with Earth:

For early grades:

Our close connection to Earth has been expressed for thousands of years in terms of our close connection to our parents. Our own culture and many others call our planet "Mother Earth." Some cultures speak of "Grandmother Earth", or "Our Great Mother."

If Earth is our Great or Grand Mother, then all the children of Earth--the plants, animals and people--are related. The native peoples of America call all other living things "our relations" or "our relatives." African-American folk stories tell of "Brer Rabbit" (Brother Rabbit) and all our cousins in the animal world.

Have your children write about why we call Earth "Great Mother." Discuss the theme in class.

For later grades:

Long ago people expressed their closeness to other plants and animals through adopting them as members of their families. For example, one family would say that they are relatives with the bears, another family would say they are related to the owls. Today we say that these people made the bears and the owls their "totems."

Let each child adopt a certain animal, plant, or natural element (air, water, fire, soil, etc.). Do not repeat any animal, plant or element. All together the class will make up the family of Earth. The children should study about their totem and tell the class what they do in the family of Earth: how they live and behave, and how they interact with humans and/or other plants and animals.

This guide to Earthday, 1990 was written by Frank Traina, Ph.D., the director of Sunrock Farm, an educational farm. For more information on its educational programs contact Sunrock Farm, 103 Gibson Lane, Wilder, Kentucky 41076. 781-5502.

Resources in helping to teach about Earth

National Earth Day organizers have prepared four 2-day lesson plans for grades K-3, 4-6, 7-12 science, and 7-12 social studies. These come with a home environmental survey and an action guide. They have also produced fact sheets on eight important topics: water conservation, ozone depletion, tropical rainforests, pesticide legislation, recycling programs, tree planting, acid rain, and global warming.

For copies of the lesson plans, surveys, guides, and fact sheets contact Earth Day 1990, P.O.Box AA, Stanford CA 94309 (415) 321-1990.

Earth balls are 16 inch in diameter, vinyl covered, and look like the planet Earth as seen from outer space. They need to be blown up like a beach ball. Earth balls make good teaching tools and can be ordered from Northern Sun Merchandising, 2916 E. Lake St. Minneapolis, MN 55406 (612)729-2001. They are $6.95 each (3 or more for $4.50 ea.) Add $2.50 for postage & handling.

Discovering the Living Earth:

Planet Earth behaves in ways that make it seem alive. The whole collection of living things in Earth is called the "biosphere" which when discussed with the non-living material of Earth as one entire system is called "Gaia" (Guy-a). Gaia is Earth seen as a giant organism, a real living being which regulates its body (very different from a human person by the way).

Source: See Time magazine Nov.13, 1989, p.114.

We all live *inside* Planet Earth

We grow up thinking that people live *on* Planet Earth. But this really isn't so. The atmosphere of Earth is part of the planet. A very important part. It moves with the planet and the first layer is about 60 miles high. We really live at the bottom of the atmosphere, that is, at least 60 miles *inside* of Earth.

If we think of this, then Earth isn't below us, apart from us. It is surrounding us and we are breathing it in all the time. We are like the fish swimming in the ocean, but we live in an ocean of air not water. We are a lot closer to Planet Earth than we usually think.

Classroom exercises in planetary unity

Let's All Breathe

OK children let's all take a deep breath. Now exhale. Now everyone breathe in again, but this time breath out on your hand.

Where does the air go after it leaves your body? Yes, it mixes in with the rest of the air. So when you breathe air are you breathing in the air which used to be in other people's bodies. Yes!

Do animals have to breathe? Do plants have to breathe? Yes, of course. So when we breathe we are also breathing in air that used to be in other animals and plants. So let's play a little game. Let's breathe in the air of the deer, let's send it to the trees. Let's breathe in the air of the flowers, let's send it to the snakes. Let's breathe in the air of (the children now answer) and let's send it to (the children answer).

How are we close to all the animals and plants? We all breathe each others' air!

The Great Dance

American Indians believe that everything in Earth is part of one great dance. Everything that moves is part of the Dance. Children, let's divide the class into two sections. Those to my left will say, "There is a Great Dance." Those to my right will answer and say, "Come into the Dance." Do this when I point to you.

I will now mention to you some thing in nature that is moving and then I will point to you to answer. Ready?

Teacher:"The white clouds are blowing across the blue sky."
left side:"There is a Great Dance"
right side:"Come into the Dance"

Teacher:"A red fox is chasing a rabbit across the field."
left side:"There is a Great Dance"
right side:"Come into the Dance"

Teacher:"The rocks in the creek move slowly."
left side:"There is a Great Dance"
right side:"Come into the Dance"

"Now, boys and girls, you think of something in nature that is moving and tell me." (After each child's statement continue refrain:)
left side:"There is a Great Dance"
right side:"Come into the Dance"

(This exercise is best done out-of-doors where the children can shout out the refrain as loud as possible. But it can also be done effectively indoors.)

Ways of Teaching about Earth

There is a long tradition of helping children learn about Earth primarily through actual sensory contact with the things of Earth, for example, the touch of tree bark, the wind and rain in the face, the colors around us, the feeling of pretending to be some animal, plant, stone, river. After some natural experience, class discussion and/or participation in some artistic or poetic experience to validate the primary natural experience is seen as helpful in learning about Earth.